The Builder.

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Engineering Æsthetics.

IN a "Note" in another column we have drawn attention to the significance of one of the resolutions passed at a recent conference, at Paris, on the teaching of drawing and its place in general education, to the effect that in technical professional schools engineering students should be encouraged in that kind of study in drawing which would tend to educate them in an appreciation of beauty of form. In France one is not surprised at such an expression of opinion; the perception of the value of the æsthetic element in construction is in the air in that country, in a degree in which it has never been in modern England. But since that "Note" was written we have had the gratification of seeing a prominent article, and a very well-written and thoughtful one, in the pages of the leading English engineering journal, on the æsthetic aspect of engineering construction. The article in the *Engineer* of the 28th ult. is indeed one of a series to be devoted to "The Æsthetic Principles of Naval Architecture," a subject which, though of the greatest interest, does not directly concern us here; but this first article is occupied with a general consideration of the basis of æsthetic principles as applied to structure. The appearance of this article almost simultaneously with our record of the resolution passed at the Paris meeting is a curious coincidence; it is also a gratifying one, as an indication that a side of the subject which has been almost entirely neglected in connexion with modern English engineering is at last beginning to receive some attention.

As far as the article in the *Engineer* goes we are almost entirely in agreement with it; it does not, as we shall show, go far enough to take in all the aims of architecture, which was not perhaps to be expected; but as far as concerns engineering structures it preaches an excellent gospel. The curious point about the matter, however, is, that its conclusions imply the entire condemnation, as far as appearance and æsthetic treatment are concerned, of the majority of the most ornate and costly structures of modern engineering. The author of the article lays stress throughout on the importance of simplicity, consistency, and fitness for the purpose, as the ruling qualities in the treatment of engineering works. "The law of consistency is essentially one of truthfulness. There must be no deception in our structures, no dishonest trickery in our constructions, no optical delusions such as the false representation of the material . . . A plain girder will show the simplest way of connecting its two points of support, and the arched bridge will appeal to us more in particular by its simple solidity and stability. The work or duty in each case is clear. Immediately we try to add parts foreign to the main idea of the structure, or if we try to mix the designs or to combine any two or more of them, then the simplicity or directness is lost, and with it much of the pleasure we found in beholding the structure." This is admirable, and is entirely in accordance with the view we have often expressed, that some of the older engineering structures of modern times are more satisfactory to architects than the more recent ones, precisely on account of this quality of simplicity and absence of any pretending or pretentious features of decoration. But how are we to regard some of these recent engineering designs in the light of this teaching? The design made by the London County Council's Engineer for Vauxhall Bridge was strongly criticised in our columns and by architects elsewhere, and if we remember right, our contemporary the *Engineer* was somewhat indignant with us for what was mistakenly regarded as an attack on the engineering profession in the person of one of its ablest members. How far any modification or improvement of that bridge design has been brought about by the criticism to which it has been subjected we do not as yet know. But it would be impossible to imply a fuller and more entire condemnation of it than is implied in the reasoning laid down in this article in the representative organ of the engineering profession itself. The whole essence of that Vauxhall Bridge design was misrepresentation of the facts of the structure; the employment of an apparent huge column which was not a column; the addition of another absurd and useless column as a mere ornament above it; the use of prominent and violently rusticated arch voussoirs which in reality only bring an unnecessary weight on a structure which would owe none of its stability to them. Could any reasoning, again, more entirely condemn the Tower Bridge, which consists of sham masonry towers standing on sham foundations, and really supported by a steel structure inside of them; towers pretending to carry suspension chains which, if their structure coincided with their outward semblance, they could not possibly carry; towers bedizened outwardly, moreover, with useless and unmeaning "ornamental" features? The author of the article in question refers to the Tower Bridge with the mild condemnation that it "is less fortunate from an æsthetic point of view than it might have been, being partly a suspension and partly a girder bridge"; but that is not the real point, which he seems to miss. The point is that it is actually one construction, but pretends to be another. An architectural critic would add that the so-called ornamental detail is bad of its kind; but we admit that this is a point beyond the proper scope of the *Engineer* article.

This question of detail would affect also one's view of the Eiffel Tower, to which the author of the article refers as an illustration of the beauty of constructive fitness. "The Eiffel Tower should be so proportioned at each height that it may best be able to resist the pressure of the wind and the weight of its own material. Only when it is so designed can the contemplation of the structure afford us pleasure." That is a perfectly sound principle

as regards the determining of the curve of stability, and is illustrated also in the lines of a lighthouse. But the Eiffel Tower affords pleasure to no artist, despite this, in consequence of a certain commonplace and gewgaw element in its details. And there is another point in the article we are referring to which may have an application to the Eiffel Tower which does not seem to have occurred to the writer. He says "the idea of purpose, where such is found, cannot be separated from that of beauty in the ordinary sense of that word; and it is impossible, if it were desirable, to produce a pleasing structure possessing only abstract beauty and showing no purpose." This we think will be found to be true; even the most non-utilitarian structure, such as a triumphal arch, has an indication of purpose. But what indication of purpose has the Eiffel Tower? All that it represents really is what may be called "brag"—one of the most vulgar feelings of humanity. That perhaps is at the bottom of the sense of vulgarity which all artists connect with it, and in that sense it bears out the observation we have just quoted.

While heartily sympathising with the general healthy, logical, and severe line of the *Engineer* article in regard to engineering æsthetics, it does not, as we have already observed, cover all the ground connected with architecture. The writer observes that there are two kinds of purpose to be considered in relation to the design of a structure; the point is very well put in the following words:—

"There is first the purely utilitarian purpose, which may be said to be accidental, as it has no direct connexion with the object itself, although, of course, it forms in most cases the *raison d'être* of the object or structure. Secondly, there is the purpose of the structure as such, and this is the important one, as far as æsthetic considerations are concerned. In a cathedral the utilitarian or accidental purpose of the structure is the forming of a shelter for a congregation; but the great primary object of the building, as such, is the resisting of the forces of gravity and wind pressure, and the first æsthetic requirement is that the ability to do so is clearly shown. In a bridge the utilitarian purpose is the carrying of a roadway over a river or ravine; but the purpose of the bridge as a structure is to span a certain amount of space by an erection which shall be strong and stable."

Very good as far as the bridge is concerned, but the passage certainly does not cover the subject of the cathedral. It will perhaps fall in with the views of Mr. Prior, whose trenchant paper on church architecture, read at the Church Congress, will be found on another page of this issue; but we can hardly regard such a building as a cathedral as bounded by utilitarian considerations. It has, or should have, an object beyond that—the creation of a new ideal conception, a poem in stone. The requirements of structural stability must, no doubt, be satisfied and expressed; but that is only the beginning, not the end; otherwise we should never have had the glories of our mediæval cathedrals, or the majesty of the Pantheon, or the mystery of the Egyptian temple. We admit that this is beyond the province of the engineer; we only wish it to be recognised that this purely poetic element exists. So again, when our engineering theorist says that "columns and brackets will be graceful when designed so that the minimum of material is doing the maximum of work," we admit that as an admirable and complete analysis for engineering work, but not necessarily for architecture; architectural expression may demand what, from an engineer's point of view, would be waste of material; it is a matter of expression and effect.

In like manner, outside of the constructional engineering design comes the element of decorative detail, and even of such expression as is afforded by mouldings and modelling of lines and surfaces. That is an element not necessary to engineering structure, though it may be added to it; but it is one which demands a special training of eye and perception. The treatment of minor details so as to indicate or embody structural function—so as, in fact, to have a meaning—is a very delicate and refined source of interest in a structure, and must be undertaken with a taste and perception refined by study, or it is better let alone altogether. That is one of the rocks on which engineering designers get wrecked, when they try to go beyond mere utilitarian structure without the refining influence of artistic training.

Artists, however, would not for the most part attack engineering work — certainly architects would not,—if engineers confined themselves to simple structure instead of attempting to introduce extraneous and often irrelevant ornament. And the general tendency of the article in the *Engineer* is quite in that direction. "Although," says the writer, "we cannot always derive much satisfaction from the æsthetic contemplation of engineering structures, there are cases where this is possible—viz, where the systems of the applied forces and of the resisting agencies happen to be of an elementary or primary nature, and where the structure is of some magnitude. Retaining walls, lighthouses, bridges, and ships possess in a peculiar degree the qualities above mentioned, as essential to a better æsthetic appreciation." That is just what we want. Structures on a large scale, designed to resist great forces of Nature, are almost sure to be impressive if left to themselves, and not bedizened with features supposed to be ornamental. Perhaps engineers will be more ready to give heed to advice of that kind when it comes to them from one of their own representative organs.

COMPETITION FOR NEW MUNICIPAL BUILDINGS, WALSALL.

THE five sets of drawings submitted in the second and final stage of this competition are now on view in the present Art Gallery of Walsall.

The site for the new building is a good one, almost square in shape, with streets on all four sides—Leicester-street on the south-west, Lichfield-street on the south-east, Darwall-street on the north-west, and a new street, 40 ft. wide, on the north-east side. The west corner of the site is occupied already by the post-office, the south corner by the county court. The accommodation to be provided by the competitors consists, first, of a large town hall for public entertainments and meetings; secondly, municipal offices for town clerk, borough accountant, borough engineer, gas department, health department, Justice clerk, overseers, electrical engineer; thirdly, council chamber, committee rooms, and mayor's parlour; and, fourthly, space for future extension of municipal offices and for a future art gallery and museum.

In the selected design, which, as we announced last week, is by Mr. J. Gibson, the town hall is arranged so that its principal entrance, with cloakrooms, lavatories, and stairs to galleries, fits in between the post-office and county court on the Leicester-street side of the site, and its axial line runs from Leicester-street to the new street, from which latter is the artistes' entrance to the rear of the town hall. The proposed art gallery and museum is provided for on the frontage of Darwall-street unoccupied by the post-office, whilst the municipal offices are located on the remainder of the site, and utilise the frontages to Lichfield-street and the new street.

The town hall has accommodation on the ground floor for 1,222, in the gallery for 290, and in the orchestra and platform 200, making a total of 1,712. The town hall is symmetrically and prettily planned, but the exits at the principal entrance end are somewhat of the objectionable bottle-neck order, a 10-ft. opening and two 4-ft. openings from the hall leading to a crushroom from which the only obvious departure is by a 10-ft. doorway. It is true that doors are shown leading from the crushroom to the gallery stairs, but we cannot suppose these are other than communication doors, as they open directly on the foot of the gallery stairs, and two streams of the public would thus meet in a confined space. We trust that the author of the selected design will re-study his exits, as the present arrangement invites a catastrophe in the event of a panic. At the other end of the hall the exits are well contrived. The gallery, with a refreshment-room at the rear, is placed over the entrance, cloakrooms, and crushrooms. The orchestra is a semi-circular apse with organ behind. A view of the hall as proposed is given among the plates in the present issue.

The principal entrance to the municipal offices is in Lichfield-street, and leads to the grand stair by which the council chamber on the first and the committee rooms on the second floor are approached. Right and left of the principal entrance are the town clerk's offices and the gas department, the latter extending also to a similar position on the first floor. The municipal offices, occupying the frontages to Lichfield-street and the new street thus leave a large quadrangle at their rear, the centre of which is occupied by the collector's office of the borough accountant's department, which, with its approaches and the lavatory blocks, sub-divides the quadrangle into four courts, the smallest of which is 38 ft. by 28 ft. The frontage to the new street is on the ground floor occupied by the borough accountant's department, justice clerk, and weights and measures offices, with the artistes' entrance already mentioned, which serves also as a secondary entrance to the offices. On the first floor are located the overseers, borough engineer, health department, and part of gas department, whilst the council chamber occupies a quiet position over the rate collector's office in the internal quadrangle. On the second floor are further rooms for the borough engineer, gas department, and electrical engineer, as well as the committee rooms and mayor's parlour. In an attic over the centre of the new street frontage is the caretaker's house.

The elevations and details are conceived

in that phase of the Later Renaissance which the municipal buildings of Colchester and Cardiff, as well as in designs by Mr. Gibson himself, have established as the up-to-date style for municipal work, and which in Mr. Gibson's hands is vigorous and virile to an eminent degree. The ordonnance of the principal elevation to Lichfield-street is a single order running through two stories on a rusticated basement, of which the windows are plain, semi-circular headed openings. The actual front is symmetrical, but piquancy is given to the design by a boldly designed tower just round the corner in the new street, which in the design of this frontage is balanced by the end pavilion of the future art gallery. Needless to say the drawings are excellent, the ½-in. detail of the principal entrance and the interior outline perspective of the town hall especially being masterpieces of consummate draughtsmanship.

Design No. 2 in general lines has a similar disposition to that of the selected design and differs only in detail and in maturity. The town hall is in a similar position with the entrance from Leicester-street, the municipal offices and council chamber and committee rooms are similarly placed on the site with minor differences of position, and the site for the future art gallery is also identical. The external treatment is also founded on somewhat similar ideas, but lacks the dignity of the selected design by over-exuberance of clever detail. The drawings are good but not equal to Mr. Gibson's, though a perspective by Mr. Raffles Davison gives the design the best possible chance.

Designs No. 3 and No. 4 alike follow a disposition of plan on different lines to the selected and No. 2, allotting the space on the Leicester-street frontage, between the post-office and county court, to the future art gallery, making the approach to the town hall from Lichfield-street, and adjoining the county-court end of that frontage, and its axial line from Lichfield-street to Darwall-street, and the future extension of the municipal offices to Darwall-street. The municipal offices occupy the remainder of the Lichfield-street front and the whole of the new street. Even in the position of the council chamber these two designs are similar, both having it over the principal entrance to the town hall, but with the difference that in No. 3 the council chamber does not actually touch the street front, whilst in No. 4 one end abuts and has one window looking on to Lichfield-street.

In external treatment the similarity between these designs ends. No. 3 is ungrammatical and incoherent; No. 4 is scholarly, dignified, and restrained. Both are based on English rather than Continental Later Renaissance. No. 3 follows somewhat the lines of No. 2 in external grouping, in that the principal front has two dwarf towers at the ends of the façade, whilst No. 4 follows the selected design in having a single lofty tower at the angle of Lichfield-street and the new street.

Thus, whilst designs No. 1 (the selected plan) and No. 2 group together in plan with a distinct superiority of No. 1, and No. 3 and No. 4 also group together with a joint inferiority in type to No. 1 and No. 2, and a very slight superiority of No. 4 over No. 3, in façade treatment we have No. 1 and No. 4 on somewhat similar lines, and No. 2 and No. 3 grouping together in general with faults similar in kind, though not in degree.

No. 5 occupies a place by itself, differing in type of plan and in external composition, which latter is undoubtedly the strong point of the design, and as shown in the perspective presents an admirable grouping. In plan the author has abandoned the part of the site between the post-office and county court, and restricted himself to the remainder, with the municipal offices compactly arranged upon the front half, next Lichfield-street, of his restricted area, the town hall at the rear of this, with its main entrance from the new street, and a future public library and art gallery at the rear, fronting Darwall-street. The result is a workable and reasonable plan of distinct type from the others in this final stage, and possibly not inferior in type to the selected design, which, *qud* plan, maintains its position by the completeness with which it is worked out in detail.

This superiority in plan, combined with the undoubtedly best architectural treatment in elevation and detail both externally and internally, fully justifies the judgment of the assessor, Mr. Macvicar Anderson, in placing this design first amongst an excellent collection of competition drawings—excellent in plan, elevation, detail, and draughtsmanship, in spite of the faults which we have noted in the comparison of the various schemes.

NOTES.

The Palace of Odysseus.

Archæological discovery up to the present day has been more successful in throwing light on the Iliad than the Odyssey. Two sites on the modern Ithaca have been excavated in the hopes of finding the palace of Odysseus—Aetò by Schliemann, Polis by Dr. Dörpfeld last March—both in vain, or at least with negative results. These negative results have, however, borne fruit in so far as they have decided Dr. Dörpfeld to seek the ancient Ithaca elsewhere, *i.e.*, in the modern island of Santa Maura, the ancient Leukas. Classical scholars have long been conscious that the modern Ithaca fitted in but ill with Homer's descriptions. We cannot here detail the discrepancies, but one salient example may be given. Odysseus has flocks and herds on the mainland, and there is constant communication by ferry; the modern Ithaca is twenty miles out to sea. Early next year Dr. Dörpfeld proposes to excavate certain sites in Leukas; funds have been placed at his disposal by a rich Dutchman, Mr. Goekoop. An interesting feature in the archæological tour annually directed by Dr. Dörpfeld will be a visit to Leukas with an exposition of the results of the excavation.

French Views on Teaching Drawing.

We recently gave a short report of the Congress in Paris on the subject of "L'Enseignement du Dessin" (see *Builder* of September 15 last). We have since received a copy of the resolutions adopted by the Congress, some of which are worth notice. Under the head of "Enseignement Général" the following two resolutions were adopted:—

"1. That drawing ought to be compulsory in all schools, and in all examinations and competitions in general education without exception.

2. That in all examinations in general education, an absolute inability to draw should disqualify a candidate."

We presume that "Enseignement Général" may be taken to be the equivalent of what is classified as "Primary Education" in England; and if so, the second resolution quoted is more decisive than anything that has been said or resolved on the subject in this country. Under the head of "Enseignement Populaire de la Composition Décorative" it was resolved that—

"In the elementary teaching of drawing there was opportunity for a gradual introduction of the study of decorative composition."

Following upon this was a resolution that a normal system of instruction for professors of drawing should be established. A still more important resolution was passed in connexion with the question of special technical education, the object of which evidently is to amend some of the deficiencies of education in architects and engineers alike—to supply each with what he is most often deficient in. The purport of the resolution in question was that in technical schools for the teaching of architecture and engineering, the engineers should be required to go through studies "susceptibles de faire comprendre la forme et son rôle dans la création du Beau." If we could only teach the engineers *that*, it would indeed be a step gained, and we should be deeply indebted to the French for leading the way.

Building and Drawing.

In Mr. Prior's very outspoken paper on "Architecture in Relation to Religion," read at the Church Congress and printed on another page of this issue, there is much with which we agree; and at all events it is a wholesome outbreak of criticism from rather a new point of view. But there is one point on which we should certainly like an explanation. Mr. Prior says that architectural competition for churches is a competition not in building capacity, but in the representation of it by drawing, and that "it is a practical futility to institute a competition in one thing—designing on paper, when the thing to be selected is another—the ability of a churchwright." We are not arguing, at the moment, in favour of competition; but we want to know what is the logical outcome of this argument. Mr. Prior has built churches. When he is asked to build a church, does he go on the ground with a staff of workmen and set out a church out of his head and overlook its building, without either making any drawings for his own guidance and that of the workmen, or showing any design to the people for whom the church is to be built? If that is the case, we can at all events understand his position. But if he does show a drawing, a design on paper, to the Church Committee or the clergyman, how can he blame competing architects for doing the same? If one architect may (or must) make a drawing to satisfy his clerical clients, and to show them what the building will be like, why, as a matter of principle, may not twenty or thirty do so?

Christ Hospital.

Whilst it is not expected that the buildings and site of the Bluecoat School will be ready for sale before the close of next year, certain minor portions of the fabric have already been destined for reinstatement at the schools now being erected at Horsham from the designs and plans of Messrs. Aston Webb and Ingress Bell. The Hospital

Governors have removed the facing bricks, with the façade of coupled pilasters and angle-pediment, its alcove, statue of King Edward VI., and the inscribed stone, from above the main entrance-door in the southern block, which forms one side of what is now known as "the Garden," being the cloister court of Grey Friars monastery. That block, having the Latin School in its upper floor, was built in 1682 by Sir Christopher Wren at the charges of Sir Robert Clayton (Lord Mayor, 1679), who contributed munificently towards the rebuilding of the school after the Great Fire, which also consumed all, the library excepted, of the adjacent Christ Church or Grey Friars. The south side of the block was built upon a thick wall, constructed of chalk, flint, and Kentish rag, which formed the north wall of the nave of Grey Friars. Wren was employed at the Hospital during some years; his other work there comprised the Writing School, 1694, erected at the cost of Sir John Moore (Lord Mayor, 1681), and, it is believed, the old hall, pulled down in 1827, on the west side of "the Garden." Amongst the statues taken to Horsham is that of Moore, carved in wood, and reputedly by Grinling Gibbons. The northern cloister, on the site of Richard Whittington's library, and the range of dormitories to the east, completed in 1836, are by John Shaw the elder, who designed also the west range of wards and dormitories, being upon the site of the old hall. James Lewis, who was appointed architect and surveyor to the Hospital on January 27, 1792, designed in 1793 the Grammar and Mathematical Schools, which have since been practically rebuilt by John Shaw the younger. Within the area known as "Hall-play," which one sees from Newgate-street, is the site of the Little Cloister of Grey Friars. The hall, designed by Shaw, was opened on May 29, 1829. Shaw, who died in 1833, was succeeded at the Hospital by John Shaw the younger, who carried out his father's designs for the new school buildings. The hall, which measures 187 ft. by 51 ft., and is 47 ft. high, is built of Portland stone upon an arcade of granite. In the basement are the kitchen, 67 ft. by 33 ft., larders, cellars, &c. The open-air gymnasium represents the site of the Giltspur-street Compter, built in 1787-91 by George Dance the younger, and pulled down in 1853. The passage known as "Giffs," or "Jiffs," is lighted by six of the seven arches, greatly mutilated, of the south cloister with its buttresses of the Franciscan monastery. Between the rear of the hall and the infirmary (1822) lies the course of the City wall; the playground to the north is still known as "the Ditch."

A Street Improvement Question.

A letter from Mr. C. H. Brodie, printed on another page, calls attention to a small but important street frontage improvement which can now be made at the junction of Shaftesbury-avenue and New Oxford-street, and which seems likely to be left undone for the most absurd of reasons, viz., that each of the authorities which might provide for it asserts that it is the business of the other. Mr. Brodie wrote to the St. Giles' District Board of Works and to the London County Council on the subject, neither of which bodies seem to have questioned the advisability of the alteration of frontage suggested, but each referred him to the other as the proper body to see to it. Surely two such authorities ought to settle such a matter amicably between them, rather than let a street improvement fall between two stools in this way.

Rouen.

Few towns in France are changing more rapidly than Rouen. It may be almost said to have lost its picturesqueness, for within the last few years a large number of the narrow streets have been widened. Street improvements in France mean monotony, for each new street is modelled on the Boulevards of Paris. While we may from an artistic point of view regret these changes, they must be regarded as necessary and inevitable from the point of view of health and sanitation. Yet it is somewhat surprising that more attempts are not made in France to keep to some extent the characteristics of the old towns while widening and rebuilding the streets. In England, both at Chester and Oxford, we have many examples of such attempts being successfully made. But changes such as are occurring at Rouen seem to give permanence to the great mediæval monuments such as the Cathedral and St. Ouen, which stand almost perpetual among the changes in domestic architecture around them. Equally noticeable also is the development of Rouen as a port—docks and shipbuilding yards may now be seen in active use, and steamers of considerable draught discharging cargoes carried from overseas. Fortunately, Rouen—sometimes called the Manchester of France—has not had to make a canal, but the distance—eighty miles from the sea, must always handicap Rouen as a port, in competition with Havre.

Sanitary Condition of Windsor.

The sanitary condition of Windsor has been for many years a constant subject of complaint, and Dr. Bulstrode's report to the Local Government Board on the subject, and on the character of the Town Council's administration, shows that things are still in a very bad state. Windsor is a "water-closet town," but up to a comparatively recent date there were a large number of closets not provided with water, and the unsatisfactory method of hand-flushing was accordingly resorted to. The nature, direction, and soundness of the house drains is usually a matter of pure conjecture. In the poorer parts of the town drain ventilation is often entirely absent, as also are any opportunities for drain inspection. Probably but few of the older drains would withstand the water test, and it does not seem that any decisive effort has been made to ascertain the exact state of affairs in this respect. The sewers are of diverse kinds; some are old brick barrel sewers, others pipe sewers with clay joints. The levels vary considerably, and in certain instances the fall of the sewer is in the opposite direction to the flow of sewage. The ventilation of the sewers is very inadequate. House-refuse is stored partly in ashpits and partly in movable receptacles; but in this matter of storage there is room for much improvement in the poorer parts of Windsor. There are accumulations of heaps of refuse, partly vegetable and partly animal, upon the bare ground; and in times of rain this decomposing refuse is washed into the subsoil in the neighbourhood of inhabited houses, and in times of drought and wind is scattered broadcast. Many of the houses in the poor quarters of the town seem to be in a wretched condition. Dr. Bulstrode says, on this head:—

"It is in reference to the non-weatherproof condition of these houses that the most serious considerations arise. I inspected a very considerable percentage of these houses, with a desire to obtain a good average idea of the state of affairs existing. I was especially invited to enter certain houses, the tenants beckoning to us to inspect their abodes, and to see the conditions under which they were obliged to live. There was distinctly a pathetic side to this inspection of Victoria Cottages, the inmates, seeing members of the Town Council with me, thinking that at last, at any rate, there would be some redress."

This state of things, almost at the doors of one our great Royal residences, seems a national disgrace.

Improvements in Hansom Cabs.

In reference to a note on this subject in our last issue, Mr. Alfred Knight, of Dorchester, writes to us that he has long ago built hansoms with the two improvements we mentioned as so necessary, viz.: a dirt-shield to the wheels and a method of putting the front window under the control of the passenger. It is called the "Allington" cab, and he has sent a number to Bristol, Hull, Warrington, &c., but cannot get them taken up in London. It is the usual story of the absurd conservatism of London, which accepts every existing inconvenience as inevitable, and refuses to look at improvements. It was thus that we had the old unwieldy dirty omnibuses with straw in the bottom still running in London, years after the leading provincial towns had established a far superior pattern of omnibus; it is for the same reason that we have the worst river steamers in the world; that we have four-wheeler cabs which are a disgrace to a capital city, while in Liverpool or Manchester you can hail on the streets a vehicle almost equal to a private brougham. And thus the hansom cab, originally a London invention, remains what it was when first invented, and provincial improvements on it are persistently ignored both by the public and the carriage-builders. That is always the way in London.

Liverpool Architectural Society.

The annual Report of the Liverpool Architectural Society, which is printed in a beautiful type and got up generally in an artistic manner, contains the last President's address, which was printed at the time in our columns. In the general report it is mentioned that during the last Session, out of eleven papers read, seven were contributed by members of the Society which is said to be "a distinct improvement on previous years." The new feature in the shape of having "members evenings" for the reading of papers by young members, the chair being taken on each occasion by a Fellow of the Society having special knowledge of the subject, is said to have proved very successful. This seems to be somewhat on the lines of the Discussion Section of the Architectural Association with its "Special Visitor."

Royal Academy Lectures.

It is announced, in the Royal Academy Prospectus of Lectures for the Session 1900-1901, that lectures on architecture will be given by Professor Aitchison on January 28 and 31, and February 4, 7, 11, and 14; but

the subject is not announced. Professor Val Prinsep will give six lectures on painting, commencing on January 7; in this case also the subject of the lectures is not announced. No arrangements have been made for the delivery of any lectures on sculpture. Lectures on chemistry will be given by Professor Crouch, and on anatomy by Professor Anderson; but as far as the purely artistic subjects are concerned the Academy lecture system seems to be in rather a slack condition.

THE STATISTICS OF SAXON CHURCHES.

BY PROFESSOR BALDWIN BROWN.

II.—The Criteria.

The distribution of the examples under notice is shown on the accompanying map (fig. 1), and suggests some comment. They are in the first place confined to England. In the Lowlands of Scotland, though some districts of them received at an early date an Anglian population, the researches of Messrs. McGibbon and Ross* have not revealed a single example with the special Saxon characteristics. In Wales Bloxam claimed an Early Saxon origin for the tower at Priestholme on Puffin Island, but this is clearly Norman, of no earlier date, though of simpler workmanship, than the tower of Penmon Priory Church on the neighbouring coast of Anglesea. Nothing Saxon seems to have been noted elsewhere in the Principality or in Cornwall. The early ecclesiastical buildings in all these parts of Great Britain belong to the types generally termed "Celtic," which are best to be studied in Ireland, and though as archaic and as interesting as the remains of Saxon work are of a different character. There is one building in Ireland which has been claimed as akin to our own Saxon structures, and this is the western part of the priory church at Howth, on Dublin Bay. This structure, however, while it lacks the usual Irish characteristics, does not exhibit any of the special features distinctive of Saxon buildings. Saxon architecture proper is not only confined to England, but, as the map shows, it is more especially represented in the Eastern and Midland counties. Examples, if they exist at all, are very infrequent on the western side of the Pennine chain from Cumberland to the Mersey, in Stafford and Cheshire, and more to the south in the counties of Monmouth, Somerset, Dorset, and Devon. This may, of course, be explained in great part by the late and gradual Teutonising of the western parts of the country; but it is not a little remarkable to find in Shropshire a kind of wedge of Saxon architecture driven, so to say, into the midst of the district in whose early ecclesiology Celtic traditions were predominant. The Saxon examples in this county invite the conjecture that a systematic search in the West of England generally might bring to light a good many more. The south-western counties probably contain more examples than have as yet been noticed.

The suggestion just made has wider bearings. Taking not England as a whole, but the smaller areas of the eight different districts into which for convenience sake the map has been divided, we note a tendency among the examples to fall into groups, while pretty wide regions are, on the other hand, left blank. The explanation partly is that when one example in a certain district is brought to light and commented on, the interest thereby excited leads to the recognition of other examples of a similar style of work in the neighbourhood. A group is in this way formed in one district, while in another the initial discovery still remains to be made, and the ground is in the meantime barren. It would be a mistake, therefore, to attach too much significance to the actual distribution of the monuments on the basis of our present knowledge. These geographical statistics must be regarded as to some extent provisional, and the barren regions should in the meantime be regarded as places where local investigation is especially called for. For the same general reasons it would be a mistake to attach too much importance to the local distribution of features and details. That no pilaster strips and only one doubtful example of long-and-short work are to be found in Kent, while both occur commonly in the rest of the District I., may be merely an accident, and the same may be said of the comparative rarity of double-splayed windows in Lincolnshire and the North generally, as contrasted with their abundance in East Anglia. Except in the case of the square western towers there are no Saxon features or peculiarities that seem to have any very marked local significance.

* "The Ecclesiastical Architecture of Scotland." Edinburgh. 1896-7.

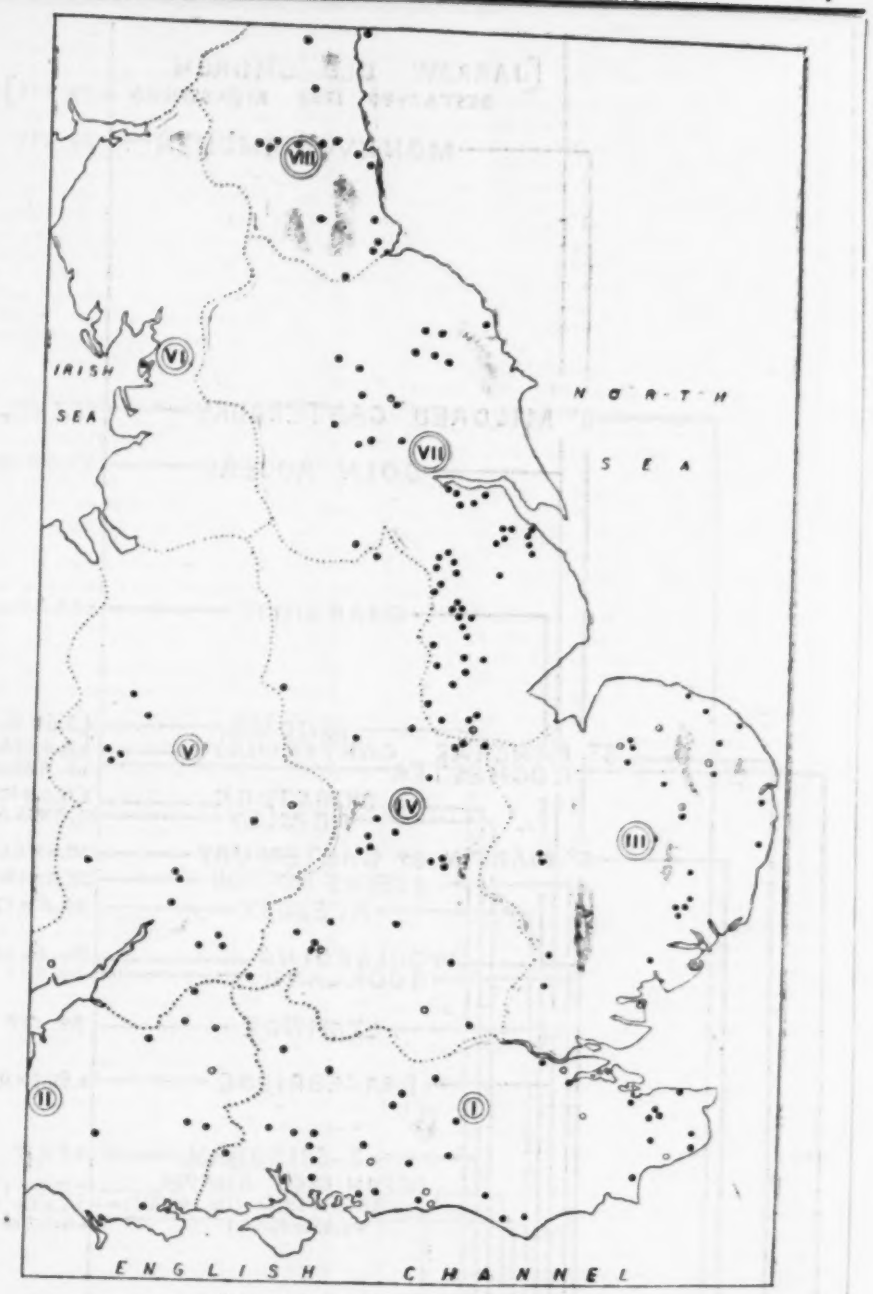


Fig. 1.—Distribution of Saxon Churches.

(Doubtful examples are indicated by open circles. The dotted lines show the boundaries of the districts into which the country is divided for the purpose of the catalogue.)

With regard, now, to the criteria of pre-Conquest work, in nearly every case the question resolves itself into one between Saxon and Early Norman, and accordingly, characteristics which are found in both Saxon and Norman buildings are not of much help in the discrimination of doubtful examples. Features which do not occur in Norman work on the Continent are the most valuable for the purpose in view, and the appearance of them is enough either to stamp a structure as pre-Conquest, or to prove the survival or occasional recrudescence of native English traditions among Anglo-Norman builders. For example, the peculiar method of treating the quoins of a building in the so-called long-and-short work does not occur in the Duchy, and it is one of the safest tests of Saxon technique that we possess. It is, however, found exceptionally in Norman buildings in this country, and it is important that this fact should be recognised. A Norman doorway at Stow, Lincolnshire, shows it, and it appears also in the Norman entrance tower of Rougemont Castle, Exeter. This helps to remove a difficulty in the dating of the fine cruciform church of Cholsey, Berks, the Early English choir of which has been described as "one of the finest parochial chancels in the kingdom." The building has a massive central tower, in the quoins of which long-and-short work is distinctly apparent. The tower walls below, however, are nearly 6 ft. thick, and are pierced east and west with doubly-recessed arches and with plainer arches north and south, all of decidedly Norman character, which appears also in the other parts of the church. Cholsey is clearly an example of the survival of some of the peculiarities of pre-Conquest masonry in Norman times.

Buildings may be pronounced with greater or less confidence to be pre-Conquest on grounds which may be thus classified:—1, Chronological likelihood; 2, proportions; 3, technique; 4, openings; 5, features and details; 6, ornament. With regard to 1, where there is evidence to show that an arcade has been cut through an earlier wall, and when that arcade is Norman, it seems an obvious inference that the wall belongs to the earlier period. A good deal depends, however, upon the date of the Norman work, for it is quite possible that an early Norman wall may have been cut through in later Norman times, just as, to compare great things with small, the choir of Lanfranc at Canterbury was replaced within the Norman period by the grander structure of Ernulf. This question was posed by the late Professor Freeman in a paper

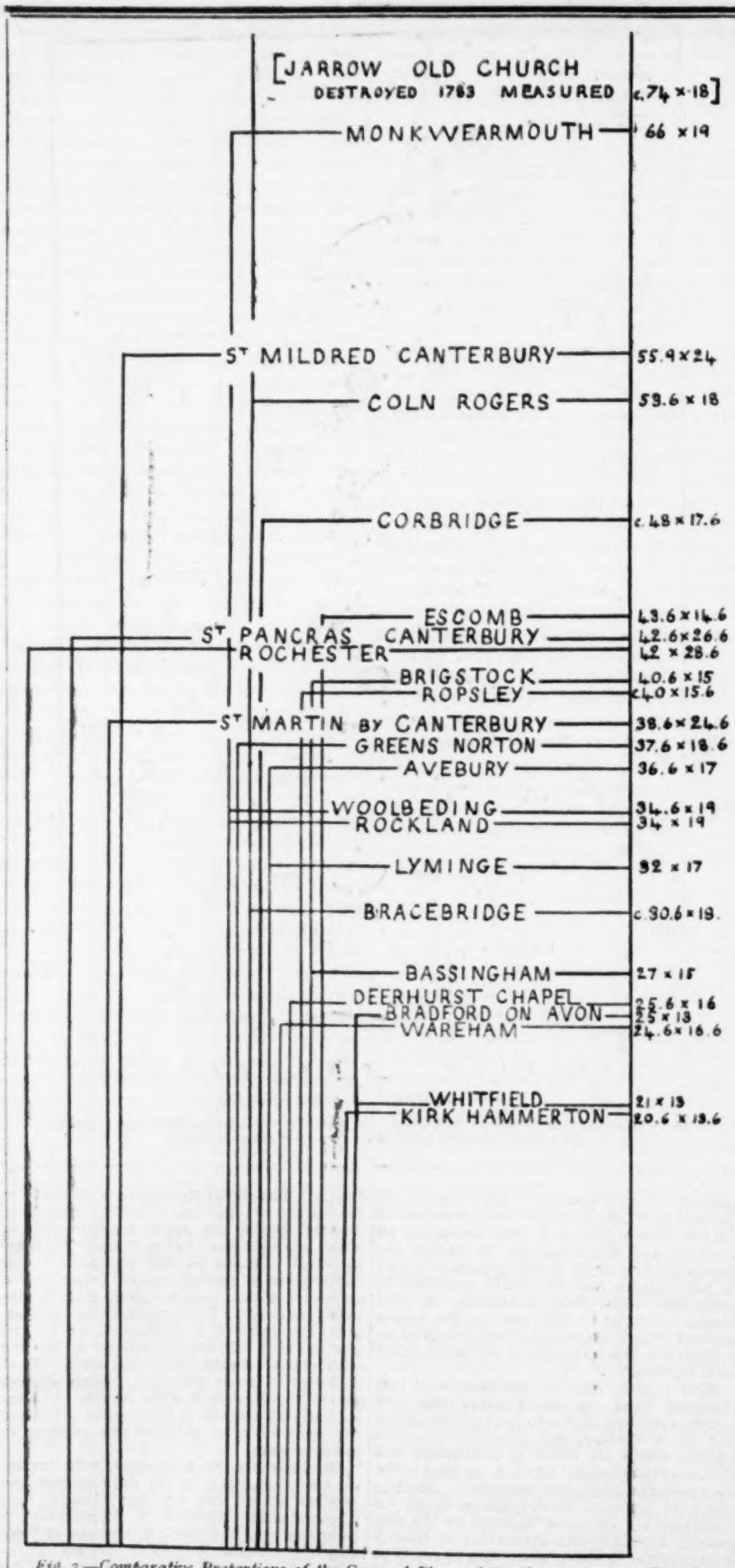

[JARROW OLD CHURCH
DESTROYED 1783 MEASURED c.74 × 18]
MONKWEARMOUTH 66 × 19
St MILDRED CANTERBURY 55.9×24
COLN ROGERS 53.6 × 18
CORBRIDGE c. 48 × 17.6
ESCOMB 43.6×14.6
St PANCRAS CANTERBURY 42.6×26.6
ROCHESTER 42 × 28.6
BRIGSTOCK 40.6 × 15
ROPSLEY c.40 × 15.6
St MARTIN BY CANTERBURY 38.6×24.6
GREENS NORTON 37.6 × 18.6
AVEBURY 36.6 × 17
WOOLBEDING 34.6 × 19
ROCKLAND 34 × 19
LYMINGE 32 × 17
BRACEBRIDGE c. 30.6 × 19
BASSINGHAM 27 × 15
DEERHURST CHAPEL 25.6 × 16
BRADFORD ON AVON 25 × 13
WAREHAM 24.6 × 16.6
WHITFIELD 21 × 13
KIRK HAMMERTON 20.6 × 13.6

Fig. 2.—Comparative Proportions of the Ground Plans of the Naves of Saxon Churches.

commonly accepted principle that a nave exceptionally long or exceptionally high in proportion to its width may, in the absence of definite marks of date, be fairly suspected of a pre-Conquest origin. The Norman church, on the contrary, is regarded as in its normal form comparatively low and wide, and this difference is made to serve as a practical criterion of date. It is one, however, that must be employed with considerable caution. It may be true that the Norman churches of this country are, as a general rule, comparatively low and wide, but at the same time the fact must not be lost sight of that there are aisleless Norman churches, the side walls of which are of remarkable proportionate elevation. Barton Seagrave, Northamptonshire, is a good illustration. Norman towers are generally, but certainly not always, of broad proportions. There is a group of tall and slender ones between Caen and the sea, and there are also English examples, such as Weaverthorpe, on the Yorkshire Wolds. Moreover, pre-Conquest naves are by no means always high, and there may be cited as examples—Kingsbury, Middlesex; Britford, Wilts; St. Michael, St. Albans; St. Martin, Canterbury; Coln Rogers, Gloucestershire; Boarhunt, Headbourn Worthy, Corhampton, Little Sombourn, all in Hants, which would never strike an observer as lofty churches. Pre-Conquest naves, moreover, are not always long in proportion to their width, as the accompanying diagram will make clear (fig. 2).

There are there shown the approximate dimensions of the ground plans of more than a score of pre-Conquest churches arranged in such a form that the comparison of their proportions becomes easy. It will be noted that among the examples that have the reputation of being especially early there are two groups, one in Kent—*e.g.*, Rochester and St. Pancras and St. Martin, Canterbury, which are particularly broad in proportion to their length; the other in the north—*e.g.*, Jarrow, Monkwearmouth, and Escomb, which are equally remarkable for their narrowness. There are, however, late churches that accord with each of these schemes; Kirk Hammerton, Wareham, and Deerhurst Chapel with the Kentish group, and Coln Rogers, Brigstock, and Ropsley with those in the north, while there are examples that give all sorts of intermediate proportions. There is, therefore, no one shape of ground plan that is specifically Saxon, while at the same time the elongated ones, to which it would be hard to find a parallel in other countries, are very noteworthy. Jarrow Old Church, if we trust the measurements given in Hutchinson's "History of Durham," must have been of quite extraordinary proportions.

The criterion of proportion is thus of doubtful validity, though in the dearth of other indications it may be of use in setting on foot investigation; the third, that of material and technique, must be used with almost equal caution. Where these are Roman, as is the case in several regions, but more especially in Kent and near the Roman Wall in the north, they may be used as Saxon indications on the general ground that classical remains would be more accessible to the builder in earlier than in later times, but it must not be forgotten that Roman materials were sometimes re-used in Norman days. At the same time, any close imitation of Roman technique or any Roman peculiarity in workmanship, such as the brickwork at St. Martin (chancel) and St. Pancras, Canterbury, the brick and tufa at Stone, near

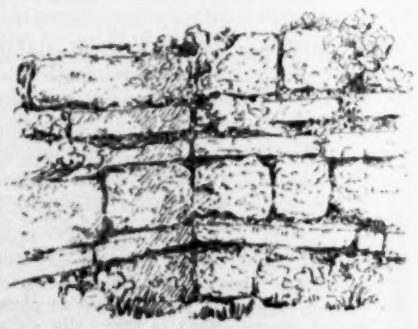


Fig. 3.—Roman Brick Alternating with Tufa and Rag at the External Angle of Nave and Chancel at Stone, near Faversham.

Faversham (fig. 3), the red mortar in the heads of the west windows at St. Martin, or the

on Iver Church, Bucks,* where it was found that the wall above a Norman arcade of the first part of the twelfth century was of earlier date, and he regarded it as inherently possible that in the same wall there might be two periods of Norman work separated by no long interval of time. This question arises in connexion with more than one example in the list.

* *Archæological Journal*, vii.

We have already seen that the mention of a church at a certain place in Domesday or earlier documents is no safe guide to the date of existing work upon the spot.

(2.) Where there are no features visible, and masonry is concealed by plaster, the proportions of a building are often used as a criterion of its date, and it is of some moment to know how far such evidence can be trusted. It is a

mortising of the jambs and imposts of the southern opening of the nave at Britford,

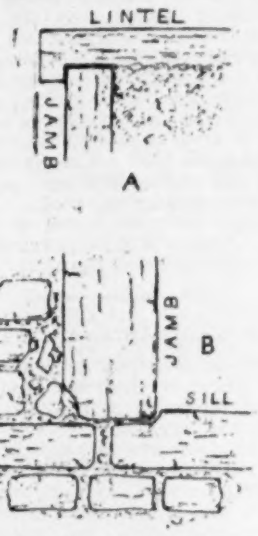


Fig. 4.—Roman and Saxon Mortising.

A. Britford, Wilts: south doorway (Saxon).
B. Doorway at Cilernum, Northumberland (Roman).

Wilts (fig. 4), is very suggestive of a really early date.

One characteristic Saxon method of using up older material is to strengthen the angles of buildings with large squared Roman stones, either set up on end or laid Norman fashion, which form what are called in these papers "big-stone quoins." Such stones need not be always Roman, but are so in a great number of cases, and the particular mode of quoining is doubtless due in the first instance to the fact that such large Roman stones were available. Now it is in connexion with such stones that the question has been raised of Saxon tooling. On many of these big quoin stones, as at Stow, Lincolnshire, and Bosham, Sussex, there is observable diagonal and cross hatching, bolder and less regular than Norman tooling, but this is really the mark of the Roman masons. Stones tooled in just the same fashion may be seen *in situ* in the Roman Wall and stations in Northumberland. Saxon tooling as distinct from Roman and Norman has yet to be established. The characteristic Norman diagonal tooling is to be seen on several pieces of stonework that are pre-Conquest in appearance and surroundings, and its existence there is no necessary proof that the work is not of Saxon date. The crucial instance is the old west door of the nave at Kirkdale, Yorkshire, which can be dated by an inscription at about 1060, and which shows "Norman" tooling on the stones. The undoubtedly Saxon doorway at Sherborne Minster has also this tooling on the jambs.

The re-use as building material of Saxon carved stones in walls of pre-Conquest character, as at Billingham, Durham; Middleton, Yorks; Marton, Lincolnshire, &c., is a pretty clear proof that such walls are late in the style, but not necessarily that they are Norman. The characteristic Norman materials, Caen stone and tufa, are found occasionally in Saxon buildings—the former, *e.g.*, at St. Mary, Dover Castle, the latter at Stone-by-Faversham and Swanscombe Tower, Kent.

In respect of fabric as apart from material, Saxon walls may be either thin or thick. In the north they are almost universally thin, and this is often the case in the south, as at St. Pancras and St. Martin, Canterbury; Whitfield, Kent; St. Martin, Wareham, Dorset; Avebury, Wilts, &c. The numerous towers in the north have, as a rule, walls so thin, that they must have been very well constructed to do their work. At Monkwearmouth, Durham, and also at Bardsey, near Leeds, towers are reared upon walls (apparently of earlier porches) measuring less than 2 ft. in thickness. There are, however, Saxon walls fully 4 ft. thick at the base, as in the nave at Brixworth and the towers at Clapham, Beds, and Earls Barton. The walls at St. Michael, St. Albans, measure about 3 ft. 10 in. One characteristic all Saxon walls have in common, in that they are constructed on the homogeneous, not the core-and-facing, system. Both systems were employed by the Romans. In the parts of the Continent nearest to Britain the Roman core-and-facing technique survived in the early Mediæval structures built with a core and faced either with small squared stones (*petit appareil*), or else with reticulated and herring-bone work, as in the Classic example at Cravant. The Norman builders, both here and in the Duchy, follow this tradition, and their normal squared-stone facing, or their more ornamental treatment in diamonds and diagonals, are just survivals from early Mediæval and Roman practice. In our own country, where Roman work on both systems is still sufficiently *en évidence*, there are a large number of Roman walls, both in villas in different parts of the country and the stations by the Roman Wall in the North, that are thin and homogeneous in fabric. From these were undoubtedly derived the ordinary thin Saxon walls above noted, for, though not nearly so carefully wrought or of such regular materials as the Roman, they agree in general structure and, above all, in thickness. Norman walls, in accordance with the building tradition at their back, are uniformly of stouter make. When they have their normal or their decorative facing they are, as a rule, readily to be distinguished from Saxon, which only in very exceptional cases exhibit the facing technique. The facing of the pre-Conquest wall at Stone is one exception, though there is some doubt whether the work may not be Romano-British. Other exceptions are the few examples of herring-boning that can be identified as Saxon. Diddlebury, Salop, is perhaps the best accredited specimen. Reticulated work, where the facing is of square stones set cornerwise, occurs nowhere in assured Saxon connexion. There still remain on the one side thick Saxon rubble walls, and on the other sundry Norman walls equally stout and showing no distinctive facing. Between such Early Norman rubble walls and Saxon ones there is really no trustworthy test of distinction, and some have tried to claim as Saxon all early rubble walls which are without the regular Norman facing. This is a tendency to be guarded against.

In the treatment of corners, stones of exceptional size, as noticed above, and long-and-short pieces are characteristically Saxon, but at the same time the usual Norman treatment of quoins, with well-squared stones of moderate size set alternately along the two faces of the corner, occurs constantly in the numerous square western towers of the north-eastern counties, most of which are on other grounds placed on the pre-Conquest side of the list. The absence of a distinctively Saxon treatment of quoins does not, accordingly, bar a claim to Saxon origin.

The "battering" of walls is from time to time advanced as evidence of early date, but walls are apt to be described as battering when they are merely leaning bodily a little out of the perpendicular. The test of measurement is not always easy to apply to the upper parts of walls. Saxon walls are, of course, often reduced in thickness at regular sets-off, and this occurs not only in towers, but in the walls of naves, as at Brixworth, and Wing and Iver, Bucks. In the towers a horizontal string course does not necessarily involve a diminution above.

Lastly, the use of vaulting is a matter to note. The only piece of Saxon vaulting to be seen above ground is the barrel-vault of the porch at Monkwearmouth, a feature that goes far to vindicate for the work the early date claimed for it, for the vault is the same in character as those in the crypts of Wilfrid at Ripon and Hexham. There was or is vaulting in the crypts at Brixworth and Wing, and a more extensive display at Repton, where the vaulting of the crypt, whatever be its date, is very irregular and tentative-looking. It is evident that the Saxons were not expert in this department, in which the Normans were, on the other hand, so skilful, that—as Mr. Bilson has recently shown*—they played a considerable part in that great development of the feature which resulted in Gothic construction.

MARINERS' CHAPEL AND INSTITUTE, GREAT YARMOUTH.—On the 26th ult. the Mariners' Chapel and Institute, which has been erected on the South Quay at Great Yarmouth, was opened. The site is at the corner of the South Quay and Queen's-road. The total cost has been about 4,000*l*. Messrs. Bottle & Olley, of Great Yarmouth, were the architects, and Mr. F. Grimble, of the same town, was the builder. A brief description of the building will be found in our issue for November 4, 1899.

* R.I.B.A. *Transactions*. Third Series, vol. vi, Nos. 9 and 10.

ARCHITECTURE IN RELATION TO RELIGION.*

I TRUST that the speakers, who have so ably represented painting and sculpture, will not suspect me of disrespect to their arts when I pointedly speak of architecture as the *practical* art. Architecture has found practice in church building, for the Church has not been able to say to the builder, "I have no need of thee." And I take this practical quality of architecture as my text—upon this platform let the art of building come into relation with religion.

I had the advantage this summer of hearing two great speakers of our Church refer to the connexions of religion and architecture. The Archbishop of Canterbury eloquently described the effect of great church building—how its contemplation lifted the heart of the worshipper; what suggestions of reverence grew out of its ordered immensity, the still voice of its perpetual preaching. Far be it from me to deprecate this conception of architecture, or to minimise what is a genuine practical quality of its expression. The Bishop of London, who followed him, went, however, further; he suggested that architecture found its ideal in church-work, because that alone could lift it above the drudgery and meanness of every-day needs. And, further, that it was by their association of painting and sculpture in their buildings that architects must make good their claim to be artists. Now this was sad hearing for architects: my art of architecture was put in a false position—false historically, if I might say so to a historian—for never in history has architecture been an art save by its own quality of practical building. And neither to the Church on the one hand, nor to painting and sculpture on the other, has it owed this quality. And depressing, too, was the Bishop's suggestion in its bearing on the work of to-day. His words were perhaps half ironical but the suggestion made, that architecture can be an art outside its practical use, is what perpetuates its degradation. While it is taken that the Church can supply an ideal or style to building, and sculpture and painting can make its decoration—that, so that is made art, which without these is only practical ugliness—so long as this idea is abroad must the Church miss the meaning of architecture, and make no good use of it.

While it may be a question whether art can come into definite relation with religion, it can be no question that such relationship must base itself on real expressions, not on false and make-believe. Yet if we look at the building work of to-day, one can only observe that church architecture is of it all the least real, the least progressive, and the least conscious of practical purpose. The amount of money and design that has been put into church building during the last fifty years has been very large, yet certainly more than half of this has been work of supererogation in adding the decorations and ornaments of Gothic and other copied styles outside the practical necessities of accommodation. Yet no life of architecture, despite the expense and pains given, has been realised. Church building has set no example; it has kept itself from no abuses; it has created no hope among artists—and little reverence. Is not this because it has missed the practical purpose of building, which alone makes architecture art? To turn to particulars, in how many cases has church building sought the aid of architectural competition? There is nothing to be said against competition in the abstract, as one of the seeming laws of our existence. But an architectural competition is not one in real work—in building capacity, but in the presentment of it, the drawing of design. I am not concerned here with the abuses of honesty, which have made architectural competitions a by-word, but with the practical futility of instituting a competition in one thing—the designing on paper, when the thing to be selected is another—the ability of a church-wright. That there is a practical failure in the method of architectural competition has been acknowledged these thirty years. It clearly proposes a false standard to its competitors—that of pleasing by representation, not by work. So far as they are architects, workers at building, they are degraded by forcing themselves under such a standard. Nor has the Church disguised its opinion of those thus invited to degrade themselves. The conditions of church

* Speech at the Church Congress, Newcastle-on-Tyne, by Mr. E. S. Prior.

competitions which have come under my eye are such that they express contempt: they have all the unfairness of the usurer's bond, giving nothing, and taking all things—that legal security which the commercial sweater exacts from the victims of necessity. Under such conditions a church competition lately in the south of England proposed to spend 5,000*l*. It obtained 150 competitors, and since six weeks of work would be necessary for each church design, 900 weeks, or about forty years, of useless, unpaid work were spent—useless, for of what avail to this or any other church were the 149 rejected designs, and the out-of-pocket expenses of the candidates exceeded probably the proposed outlay on the church.

Of course the Church does not realise this view of its competition procedure. It is only doing what others do; it is only taking what it can get. There was no compulsion on the architects to compete. So the usurer says, "The borrower signed the bond of his own freewill." But the art of architecture does realise the waste, the low ideal, the practical futility of architectural competitions, and refuses to appear in competitive churches. Let it be that money payment is never the payment of art—that the exercise of a man's faculties in a noble purpose is its own reward, that church design is such a purpose, and so is never wasted. So doubtless the Church thinks, but then let the Church honour this exercise. Let us see how it is now.

It has been too seldom that the proposer of church building—rejecting the evils of competition and the status of professional business—has proceeded on the common-sense selection of an artist whose art he perceives to be one of a personal ability in building. Still, not seldom have parson and architect with one soul desired and spent themselves on the best expression of church building that lay within their means—with such in its truest sense, "laborare est orare." But there succeeds to this inheritance another incumbent. Is there any security that he will honour the good work done? It is notorious that the incoming parson has no scruples as to the art of the church to which he succeeds. He can transform it and ruin it as he chooses; feeling quite unbound by his predecessor's selection of architect; handing the building over to commercial firms or others to add furniture, glass, screens, which, by the nature of their make, must be an insult to the real work of an artist. I know a case where the patrons of a living being the rectors had the scruple that what was well begun should not be ruined by irresponsible additions. They forbade the introduction of manifestly vulgar and manifestly unsuitable fittings into their chancel. But the incumbent was wishful for what was denied him, and went on a journey. The prohibited articles were smuggled into the church in his absence, so that he might have, but not know, and on his return plead six months' use. Now in thus getting furniture for his church, by what in plain language was a trick, he was applauded by his brethren, and the reason is clear. The patrons' control was considered unreasonable, for the architectural *art* of a church is in no honour compared with the ecclesiastical *style* of its fittings. However contemptible the art of such things, they were offered as gifts to the church, their donor had paid money for them, and this moneys-worth of ecclesiastical style could not be refused. Such donations are the passport to the title of good Churchmen. I am not speaking without authority, for in the last six weeks has not a Dean publicly declared that only subscribers to its decoration can be regarded as having any interest in a cathedral? And how often do we not hear it said by our clerical friends? "Yes, we in the charge of our churches know the value, and wish the religious expression of real art. But what are we to do? Our people will have what they can see in the shop-window, or pick out from the tradesman's catalogue. We know such things are contemptible, but can we refuse them?" No, you cannot refuse if you do not feel that religion is hurt by a false art of church building and church fitting; if you think it no great matter that the artist cannot enter a church except with repulsion, that he must hide out of sight of the chancel, and come to the altar with averted eyes. Yet they are a larger body than I think the Church understands, who are sensitive—whose consciences are troubled when they see the decorations of a church to be very much those of the restaurant and music-hall—redolent of money and display, but with neither heart, truth, nor faith in them.

Ecclesiastical styles have made the cloak that has hidden the want of reality in our art, but that cloak is slipping away and showing what is beneath. Sixty years ago, in the fervour of the Gothic revival, while it was believed that the *forms* of ecclesiastical architecture made religious art, and when in this conviction was done earnest work by Pugin, Street, Burges, and Butterfield, then churches could be built and decorated in Gothic style expressing this conviction, and not merely as business forms. But how is it now? The life of Revival Gothic is manifestly over. Its forms are an avowed professional stock-in-trade, and can be manufactured at so much the foot by any and every firm of tradesmen; but the earnestness, the self-respect of architects will not have such things. For it is perceived that the truth of art cannot be expressed in copies, in stereotype, in what can be stamped out by a machine—human or mechanical—but can come only by the emotion of the artist, and in the experimental creation that emotion fructifies. We have made a dead Gothic—have made caricatures—because by the nature of things living art was impossible to us. And caricatures, when seen to be such, what can they be in a church but offensive? The reproduction of Romanesque, Gothic, and Renaissance church-building, the nearer it gets to the originals, the more exact it is, the more machine-like—by that very quality has become the more false in spirit, the fouler to the taste, the less fitted for religious use.

It is in our old churches that "restoration" has made this offence the greatest. And I speak here not only of the actual removal, but of the swamping of the true religious work of our forefathers—the contempt of it which our church additions show—so that in the last fifty years there has been a wiping-out of that practical living work of the Gothic centuries, and of the seventeenth and eighteenth, too, which in every church of our land forged a "Catena sanctorum"—surely of value to the English church—but now broken, its real links taken away, and base metal substituted, so that there is scarcely a church left to us in which seven-eighths are not substitutions. The accomplished author of "Walks in Rome" speaks of what was till lately the best preserved Saxon church in England, but now, he says, a "mere rebuilding," with "all that vulgar tiles, revolting glass, and coarse woodwork can give liberally bestowed." Of how many thousands of our churches must not this be said? Is there no other use of our old architecture possible but to make it a block upon which to exhibit the failure of Modern Gothic? When Edmund Street's nave to Bristol and Sir A. Blomfield's nave to Southwark are seen to be graceless works that do no honour to the old, is it proposed to add the same sham dead thing to Hexham?

It can be no practical use of our present-day art of architecture to bid it be untrue to itself and think not of its real function of building, but only how it can caper, as it were, for hire and gesticulate in mimicry of artists long dead; now with cusps and crockets, and now with pilasters and friezes; with traceried reredos or canopied baldachin; now with winged archangels and haloëd saints, and now with *amorini* and cherubs, in pretence of emotions which it feels not and cannot feel, because they do not grow out of its present needs. I believe that there are among Churchmen, lay and clerical alike, many—I had almost said all, who have thought on the matter—with the feeling that there should be building by the Church other than these forgeries of ancient church decorations—this burying of the history of the English Church, its love and its art, under the ashes of "restoration."

I believe the haphazard system by which our churches get building and decoration is the reason that this feeling has not prevailed to produce a true Church art of practical building. A definite authority in the Church, advisatory and suggestive, with at least such standing as would have enabled it to review all church building and all church decoration, would have done a great deal to prevent the abuses of open church competitions, of disregard and contempt of existing church fabric, whether new or old; would have set at least a value on real art, by stating knowledge of its existence, so that it could not be removed or disfigured, as a matter of course, to make way for the rich man's gift.

But the real hope for architecture—that it may again arise in the service of religion—is not in any established authority, but in a change of feeling; in the growing conviction that church building should meet the practical necessities of accommodation, with the common-sense materials of good building, and not with any copying of ancient models. For revivals, restorations, are mimicking forms, but denying the spirit; the hypocrisy of art, and the hypocrisy of art is offence to religion. What was bidden to the feast would not come, for it was busy with ecclesiastical style, professional success, and commercial profit. Art must be compelled to come in out of the highways and hedges of plain practical building and the plain true love of the artist.

ARCHÆOLOGICAL SOCIETIES.

Surrey Archæological Society.—A Saturday afternoon visit was paid by this Society on September 22 to Waverley Abbey. Assembling at the railway station at Farnham, upwards of ninety members and friends drove to Waverley Abbey to inspect the excavations which were proceeding, through the kind permission of the late Mrs. Anderson and Mr. Rupert D. Anderson, and also Viscount Llandaff (who now occupies Waverley Hall and who was present). The visitors were received by the Rev. T. S. Cooper and Mr. M. S. Giuseppi, Hon. Secretary, and also Mr. Harold Brakspear, who described the progress that had been made with the excavations since the Society's last visit, July 28, 1898. He commenced by giving a short outline of the history of the Abbey, with which our readers are familiar; that it was a Cistercian Abbey, founded in 1128 by William Giffard, Bishop of Winchester, who brought monks from the Abbey of Aumône (Elemosina) in Normandy. Mr. Brakspear then pointed out the sites of the several sacred buildings and the subsequent additions and alterations, and the recent discoveries that had been made of various thirteenth century tiles and other relics. Large quantities of freestone had been removed from the Abbey for building cottages in the neighbourhood. The dining-room or refectory of the lay brethren was visited; this is in an excellent state of preservation, and possesses some groined arches similar to those in the Temple Church, London. The object of these excavations is to obtain a complete ground plan of the Abbey.

East Riding Antiquarian Society.—The annual meeting of the above Society was held on the 1st inst. at Howden. The choir of the church of Howden has undergone further ravages, and a portion of the windows in the chapter-house has lately fallen, and one of the first acts of the Society was to pass a resolution, moved by Lord Hawkesbury, approving of the effort to be made to prevent further decay. The members were received by the Rev. W. Hutchinson, who gave an outline of the history of the church, which was built towards the close of the thirteenth century by a Bishop of Durham, who had his palace close by. In the evening the annual dinner was held at the Wellington Hotel, Lord Hawkesbury presiding. Afterwards the annual business meeting was held. All the officers were re-elected. The treasurer's balance-sheet showed a balance in favour of the Society of 5*l*. 5*s*., and the secretary's report showed a membership of 172. Papers were read by Mr. J. R. Mortimer on "Subsequent Excavations at Danes Graves," and by Mr. J. R. Boyle, F.S.A., on "Place-names."—*Leeds Mercury.*

Barnsley Hall Lunatic Asylum, Worcestershire.—At a recent meeting of the Worcestershire County Council the Visiting Committee of this asylum reported that they had approved the report and designs of the architect for the erection of the new asylum. They recommended the splitting-up of the estate into ten to eighty acre holdings, to be let until the land is required for building. The architect's report stated that he proposed buildings for 570 patients, with administrative buildings for an asylum of 850 patients. His approximate estimate of the cost of the buildings proposed to be erected in the first instance was 205,400*l*., which worked out at an average of 360*l*. per bed, a rather high figure, due to the fact that the administration block would suffice for a larger number of patients. The extensions to accommodate 280 patients more would make the total cost about 246,500*l*., which figure showed an average cost of 290*l*. a bed, bearing a favourable comparison with the cost of several of the latest buildings for which tenders have been obtained. The County Council adopted the report. Mr. G. T. Hine, of Westminster, is the architect.

Old Houses in Holywell-street (about to be demolished).

OLD HOUSES IN HOLYWELL-STREET.

THE first step in the much-needed Strand improvement is accomplished in the broad roadway now open between St. Clement Danes and St. Mary-le-Strand churches. This piece of the Strand was formerly one of the narrowest main thoroughfares in London. Holywell-street may be the next clearance in the scheme. It may possibly stand a few more years, as the Act of Parliament under which the work is being executed allows the County Council a liberal time limit for the completion of the alterations.

Of Holywell-street itself there seems to be little history. Jack Sheppard, the notorious apprentice, is said to have been reared here. The "Holy Well of St. Clement" is close by, though the exact position is unknown. The street is one of the most picturesque and insanitary remaining in London; the three sketches we give illustrate respectively a picturesque group of old houses on the south side, a detail from a shop and a good house spoilt by a modern shop front, both on the north side of the street.

Correspondence.

To the Editor of THE BUILDER.

SHAFTESBURY AVENUE AND NEW OXFORD STREET.

SIR,—An opportunity now occurs — and seems likely to be missed—for an improvement at the junction of the above thoroughfares.

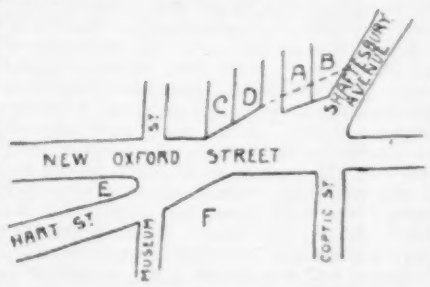
On the south side at the junction enters Hyde-street, and at the western corner of this is a public-house which is, I am informed, about to be rebuilt. Adjoining it is a vacant site where stood, until a few months ago, the Bloomsbury Distillery.

This public-house and a part of the distillery site stand considerably in advance of the line of frontage of the buildings to the east—on the other side of Hyde-street—these buildings being occupied by Messrs. Marshall & Elvy and the London and North-Western Railway Company respectively.

In June last I wrote to the St. Giles District Board of Works (the Local Authority) and the London County Council pointing out the advisability of bringing the frontage line of the new buildings to the west of Hyde-street back to the line of those on the east of that street. Each of these bodies informed me that it was, in their opinion, a matter for the attention of the other, and there I believe the matter still rests. One would have thought that these bodies would have combined to effect an improvement at a none too beautiful spot, rather than try to shuffle out of it on a plea that it was—although desirable—the duty of the other to carry it out.

Should the new buildings be erected on the present frontage lines the opportunity for improvement will have gone, probably for ever. Is it too late, even now, for the matter to be arranged? And may one hope that in future the authorities concerned will work with, and not against, each other in matters of this kind?

By the time the new Borough of Holborn is got into working order the new buildings may be in hand or finished. That body would have the power (financially) to carry out such a piece of street alignment, a power which probably the existing Local Board does not possess.



Sketch Plan.

A. Public-house; B. Vacant site; C. London and North-Western Railway Office; D. Messrs. Marshall & Elvy; E. Vienna Café; F. Mudie's Library.

A glance at the sketch plan here given will show what I suggest, the dotted line showing what should obviously be the new frontage line.

C. H. BRODIE.

INTERNATIONAL HEALTH CONGRESS, PARIS.

SIR,—My attention has only just been drawn to the report in your issue of August 25 last in reference to the paper which I had the honour to read at the Paris International Congress for Hygiene and Demography, from which it might appear that Section 3 for engineers and architects passed a resolution against the disconnecting trap for house drains. As this is not so, I shall be glad if you will allow me a little space in your paper to put this matter in its true position

Whereas M. Lacau, an architect of Paris, and M. Louis Masson, the Engineering Superintendent of the Paris Sewers, spoke against the insertion of the disconnecting trap, I expressed the opinion that this sanitary apparatus had proved very successful in the past, and should not be abandoned except under very special circumstances.

The by-laws of Paris referring to the drainage of houses, which were issued on August 8, 1894, distinctly prescribed the disconnecting trap, but as on appeal the Council of State ruled, on May 1, 1896, that these by-laws were *ultra vires*, and that the Municipal Authorities had no right to insist on special apparatus, the latter issued on May 9, 1896, a new set of by-laws, which generally prescribe siphon traps, without mentioning special ones, so that the disconnecting trap is neither specially prescribed nor specially forbidden.

In a discussion which followed the reading of the papers a good many different opinions were expressed, but in the end no resolution was agreed to concerning the use of disconnecting traps: on the contrary, eventually a resolution to this effect was adopted—that sewer gas is to be excluded from our houses.

Although this is not equivalent to passing a resolution in favour of the disconnecting trap, I venture to think it goes a long way towards it, and there can be no doubt that the opinions on the Continent against disconnecting traps are gradually passing away, as the actual facts become known. There is, perhaps, nobody who would willingly do away with a sanitary apparatus that has demonstrated its advantage by the number of its applications, which I should say reach now into many millions.

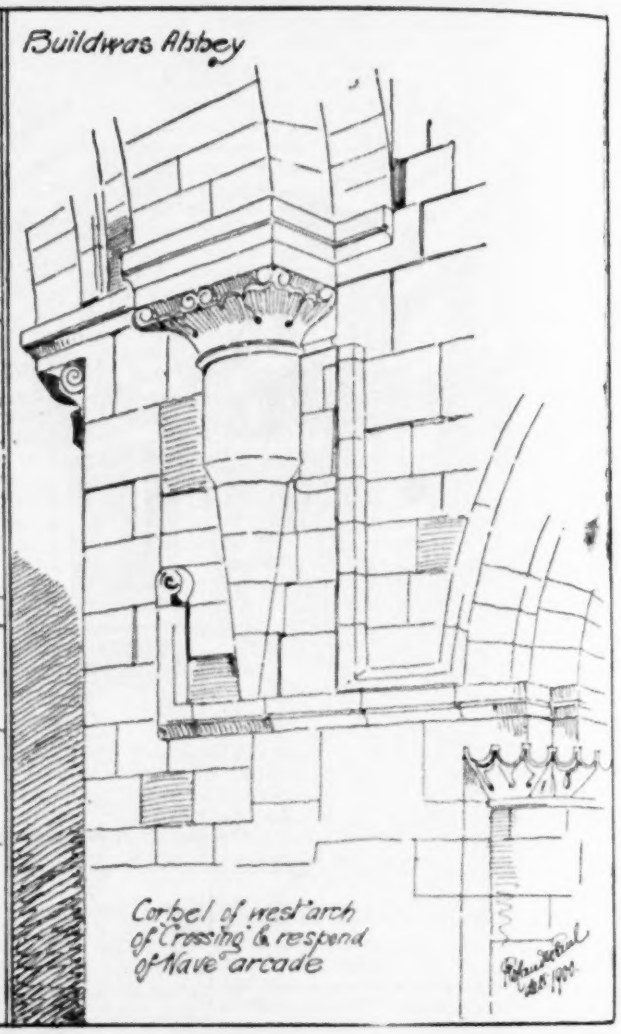
H. ALFRED ROECHLING.

Leicester, October 2.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At the meeting of this Society, held at the Royal United Service Institution, Whitehall, on Monday evening, October 1, Mr. Henry O'Connor, President, in the chair, a paper was read on "Paper-making Machinery," by Mr. Robert Henderson. In the course of it the author pointed out the general considerations affecting the design of mills, showed the absolute necessity of an abundant supply of water, as pure as could be obtained, and remarked that the quantity required in the process of manufacture might vary from 110,000 to 180,000 gallons per ton of paper made, according to quality. He described the construction and arrangement of a modern paper mill generally.

MISSION CHURCH, BIRMINGHAM.—A mission church was opened at Lozells, Birmingham, on the 20th ult. Messrs. Harley & Sons, of Smethwick, were the builders, and Mr. Daniel Arkell was the architect.



Illustrations.

BUILDWAS ABBEY.*

THE ruins of the Cistercian Abbey of Buildwas, in Shropshire, stand on the right bank of the Severn, about twelve miles from Shrewsbury. The site is well sheltered on the north by the hills surrounding the Wrekin, and on the south by the northern spurs of Wenlock Edge. It was founded in 1135, by Roger de Clinton, Bishop of Lichfield and Coventry, who gave not only the site for the abbey, but also other lands in the county, including the village of Buildwas. The family of Burnell were also benefactors, and seventeen are said to have been buried in the church.† There are two tombs of the Leighton family—now in Leighton Church, formerly at Buildwas—three effigies in all, Sir Titus de Leighton and Sir William and his wife Margaret. Among other benefactors to the abbey were Bishops of Lichfield, William Fitz-Alan, Governor of Salop, Gilbert de Lacy, and Sir Richard Corbett.‡ There were twelve monks at the suppression, and the site was granted 29 Henry VIII. to Edward, Lord Powis, from whom it passed to the Moseleys, the present owners.

The present remains are nearly all of one date—Transitional Norman—and therefore the original church founded by Roger de Clinton. With the exception of the outer walls of the nave aisles the main walls of the church remain in a fairly perfect state, and of the monastic buildings (which were, as at Tintern and Dore, on the north side of the church) two passages or "slypes," with the chapter-house between them, remain on the east side of the cloister court, and beyond are some remains of an extensive range of buildings, probably incorporating the abbot's house and the infirmary, now forming part of a private residence of the Moseley family.

The ground plan given of the Abbey shows the present state of the church, with the conjectural arrangement of altars and screens based on the traces of them which exist on the nave columns. Adjoining the north transept are the "slype" or passage leading to the cemetery, the chapter house, and a second "slype" probably communicating with the infirmary and abbot's house. At the time the ground plan published by Mr. Joseph Potter in 1847 was made, the present private residence was a farmhouse, and although the western part of it, including the so-called "Chapel" remains much as it was then, the eastern part has been somewhat altered, and additions made. We have, therefore, shown it as it was in 1847, from Mr. Potter's measurements. The buildings that stood on the north and west sides of the cloister court have been entirely cleared away. The site slopes somewhat rapidly from the church to the river, but no traces of foundations are visible. At the north-west angle of the church are the remains of a window jamb and wall. It appears to be the southern end of the cellarium, which not only projected beyond the west front but overlapped the north aisle of the nave. In all probability there was a "lane" or open court between the cellarium and the cloister court, as existed at Dore and Byland.*

The architecture of the church is of the simplest possible character, but the detail is good, and where carving is found it is excellently executed. The nave is of seven bays, with circular columns standing on square plinths and supporting slightly pointed arches of two orders. The first pair of columns west of the "crossing" are octagonal. There was no triforium. The clearstory consisted of a single round-headed lancet in each bay with a continuous string course below. There are no vaulting shafts, and it is evident that both nave and aisles were covered with timber roofs. Pointed arches of three orders lead from the aisles to the transept, each of which has two eastern chapels. The aisleless presbytery is of two bays only, one bay projecting beyond the transept chapels. The "crossing" has a low central tower over it, the north and south arches being supported by columns, the east and west arches corbelled back to the wall. In each face of the tower were two small round-headed lancets, and in the south-east angle was a staircase curiously corbelled out from the wall on its inner face. The presbytery and transept chapels were vaulted, and the vaulting in the chapels remains. Near the south-west angle of the transept was a doorway, and in the south-east angle a staircase leading to the roof, and thence to the tower. In the north wall are two doorways, the upper one in the north-west corner being the doorway of the "night stairs" to the dormitory, and that in the north-east angle leading down to the "slype." Under the northern half of the north transept is a crypt, with an entrance from the west (in the cloister) which has been suggested as the sacristy. It was lighted on the north and east by a couple of lancets, and is now entered by modern steps at its east end. The chapels of the north transept are not rectangular, the outer wall bending slightly north-east. At the north-east angle are traces of a wall, and there are considerable indications of some building having been destroyed at this point.

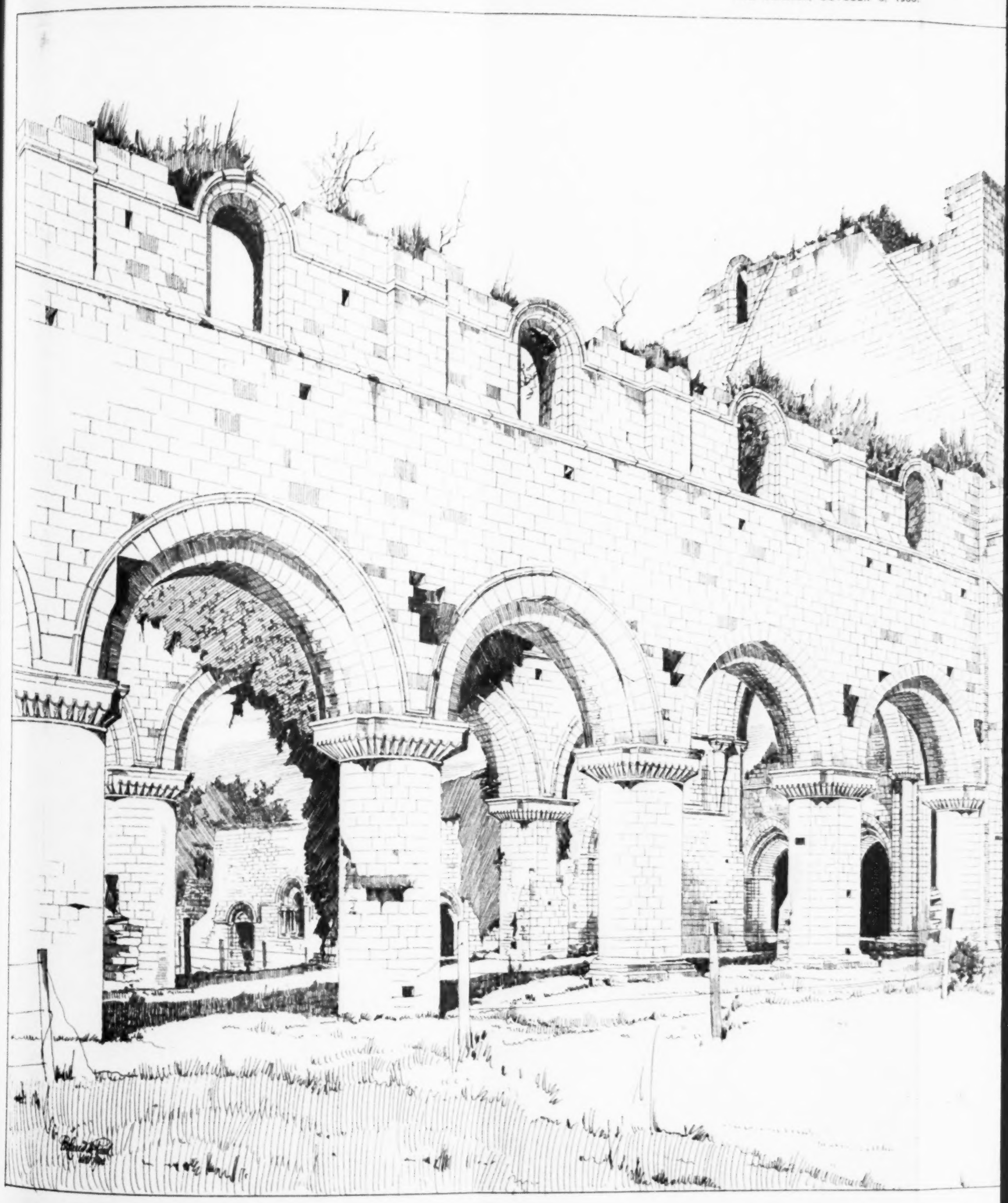
One of the chief points of interest in the church are the considerable traces it still bears of its interior ritual arrangement. In nearly all the columns of the nave are traces of the side screens which divided the nave from its side aisles, and which still remain at Tintern, and were found during the excavations at Abbey Dore. The presbytery at Buildwas retains its original form, and is short, and the ritual choir of the monks occupied the first bay of the nave, their stalls standing against the screen walls and the western piers of the crossing. Stone screens also stood under the crossing, with probably doorways near the eastern pair of piers, forming the upper entrances to the choir. The plinth of the south-east tower pier has been cut away.

Between the first pair of nave columns—octagonal in shape—was the "pulpitum," and the plinth of the columns on the north side has been cut away to receive it. The wall was, apparently, like the side screen walls, 2 ft. in width, and had a central doorway. A second screen crossed the church between the next pair of columns with the nave altar against its west front, flanked by doorways.* In addition

* For the list of Abbeys which have appeared, and for future arrangements, see front page of cover.
† Potter, Buildwas Abbey.
‡ *Ibid.*

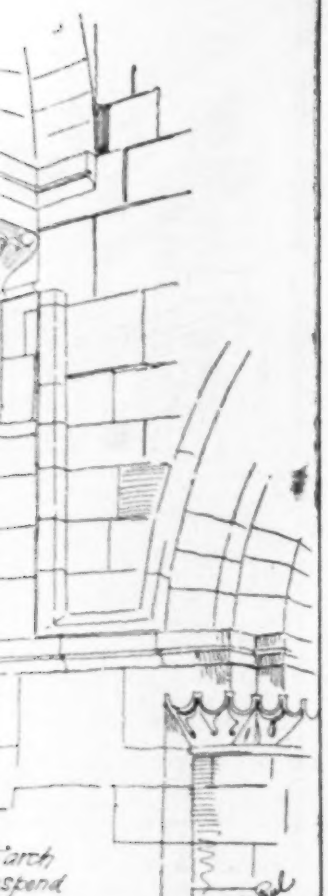
* See *Builder*, April 4, 1896, and October 3, 1896.

* See ground plan of Abbey Dore, *Builder*, April 4, 1896.



THE ABBEYS OF GREAT BRITAIN. No. 35. BUILDW

DRAWN BY MR. ROLAND W. PAUL



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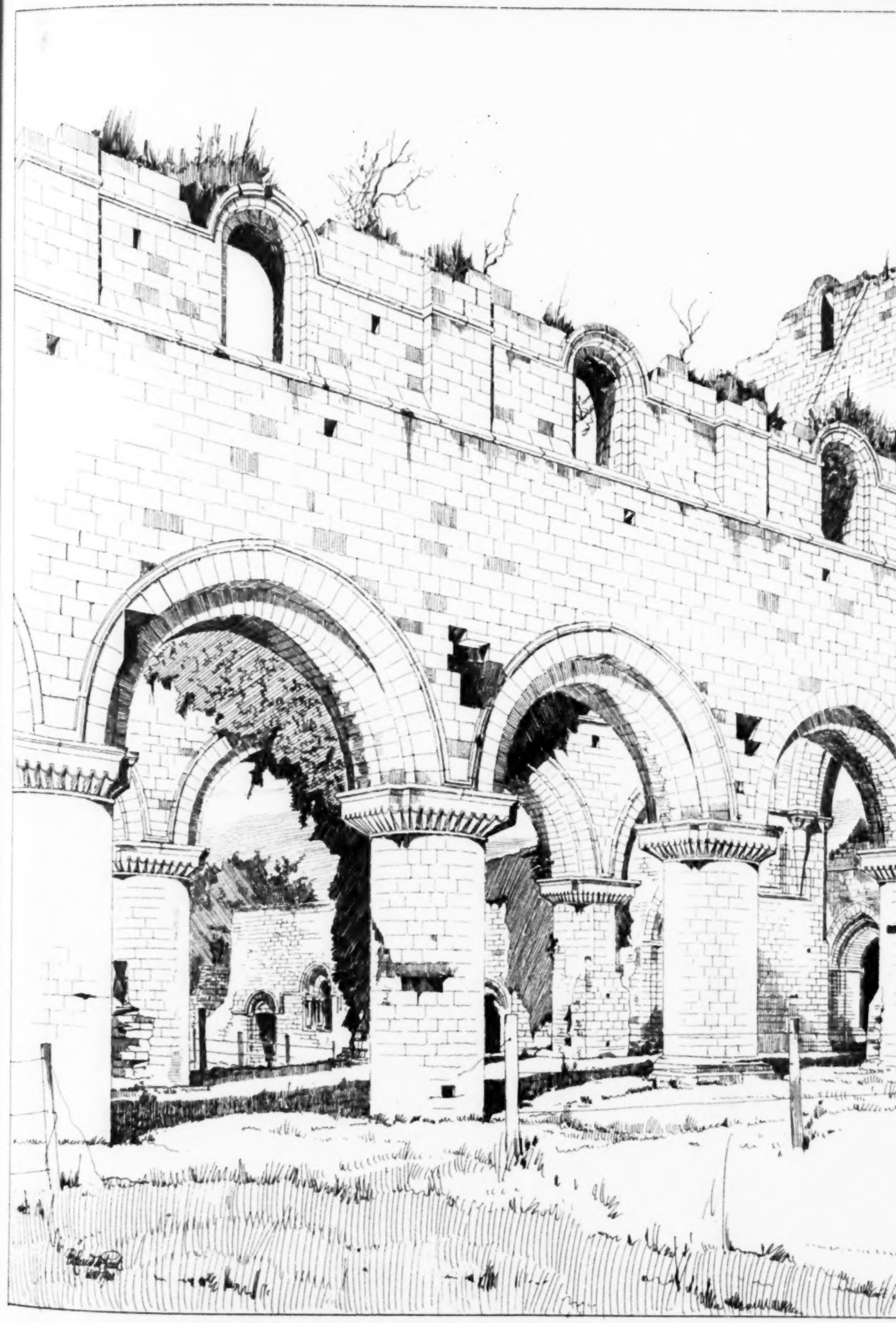
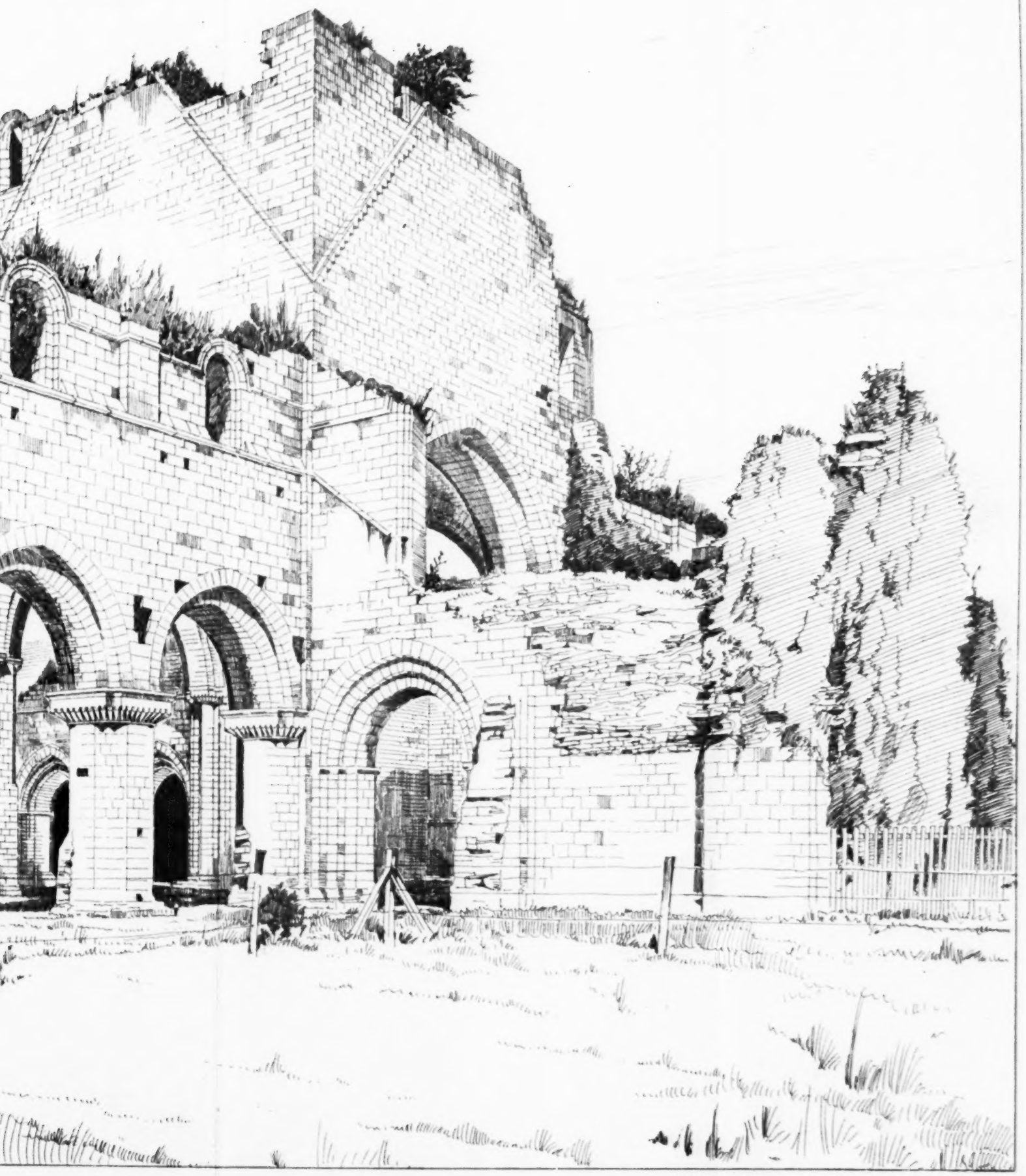
plan of Abbey Dore, *Builder*, April 4, 1896.



THE ABBEYS OF GREAT B

Drawn by Mr



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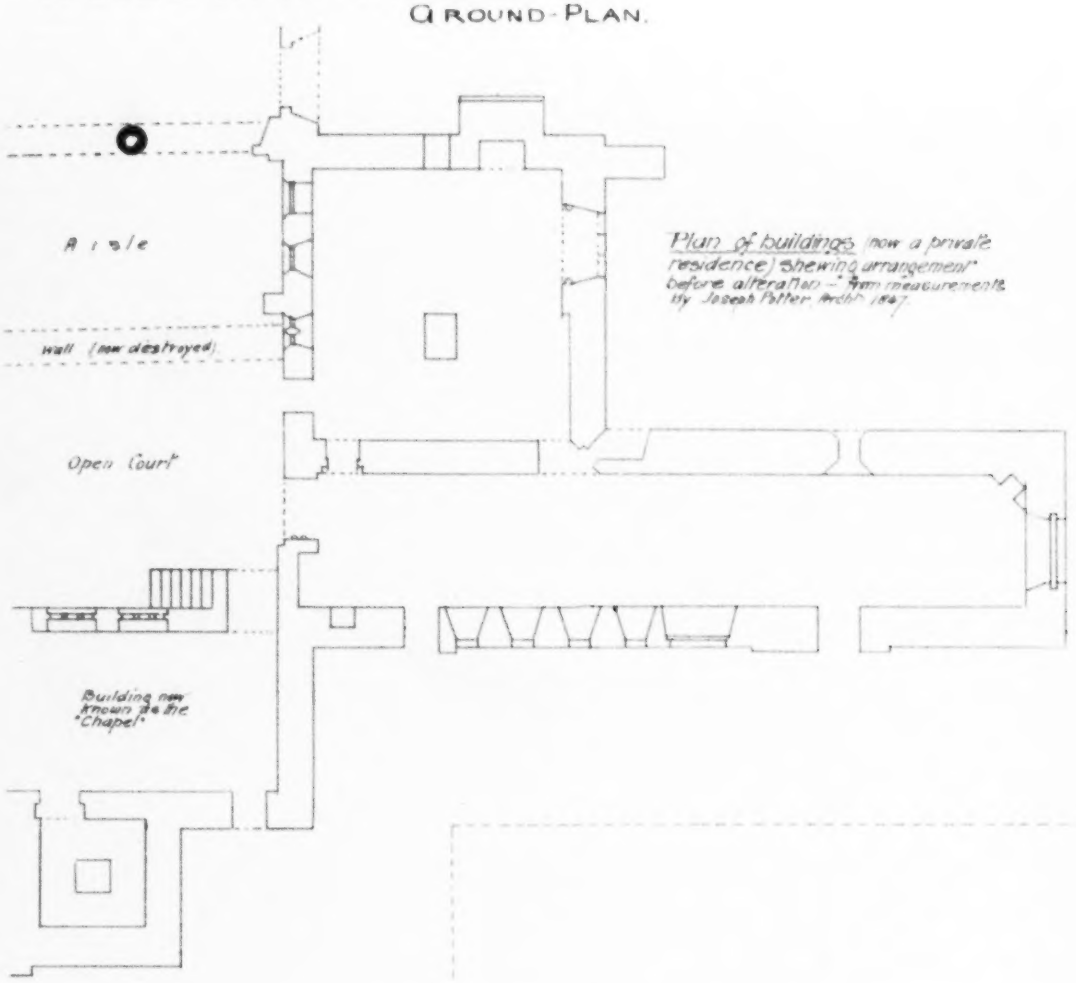
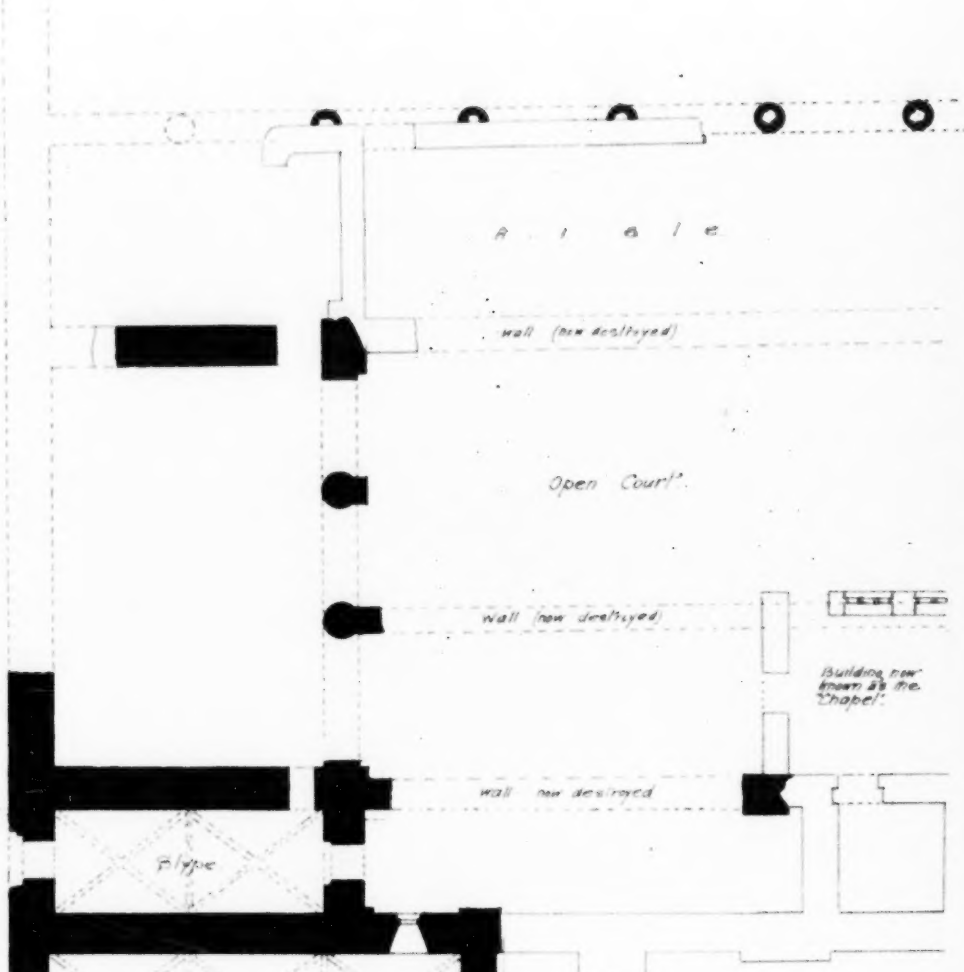
GREAT BRITAIN. No. 35. BUILDWAS.

AWN BY MR ROLAND W PAUL

BUILDWAS ABBEY

GROUND-PLAN.


Aisle
Wall (now destroyed)
Open Court
Building now known as the "Chapel"
Plan of buildings (now a private residence) shewing arrangement before alteration — from measurements by Joseph Potter Archt 1847



Site of Cloister

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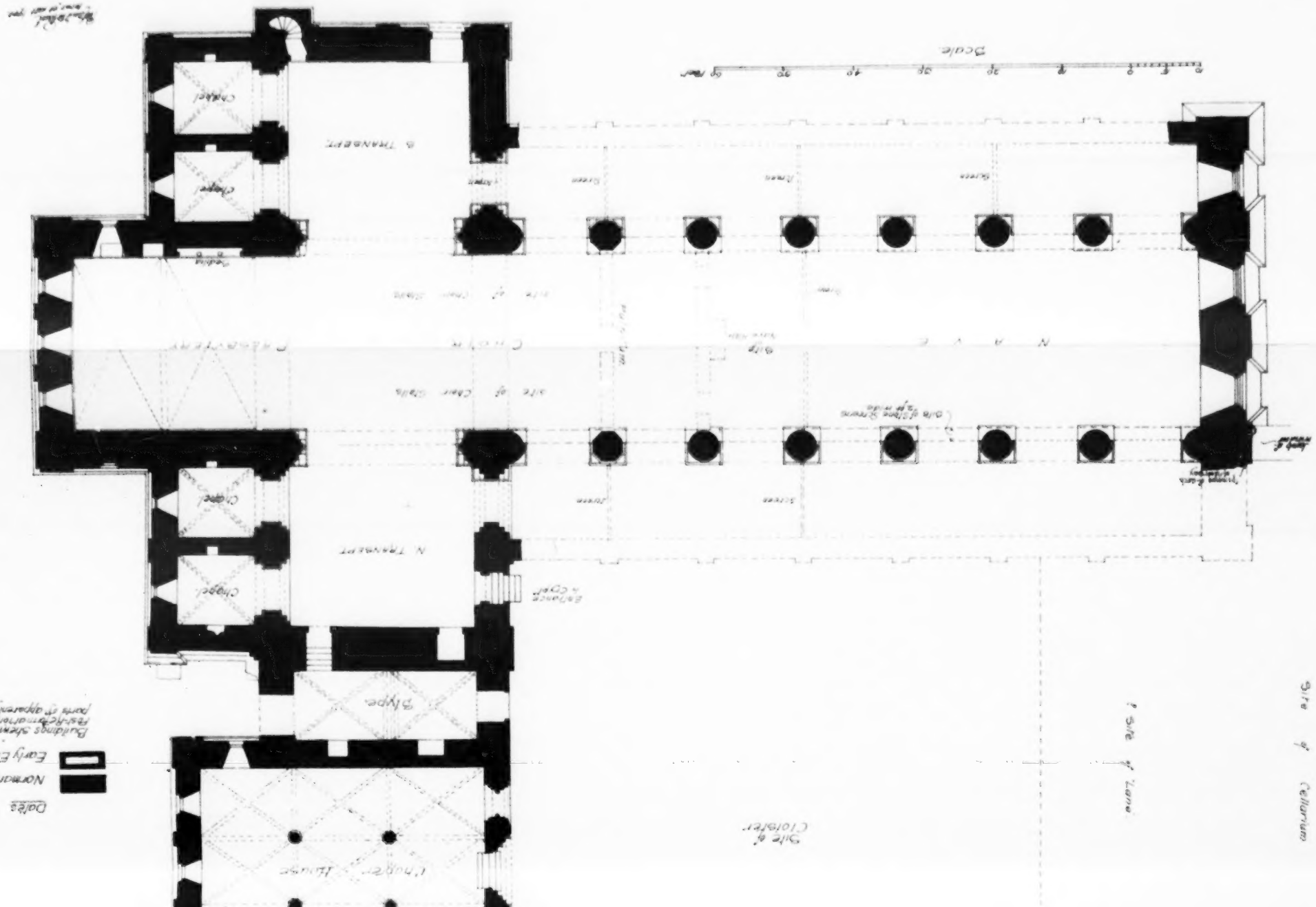
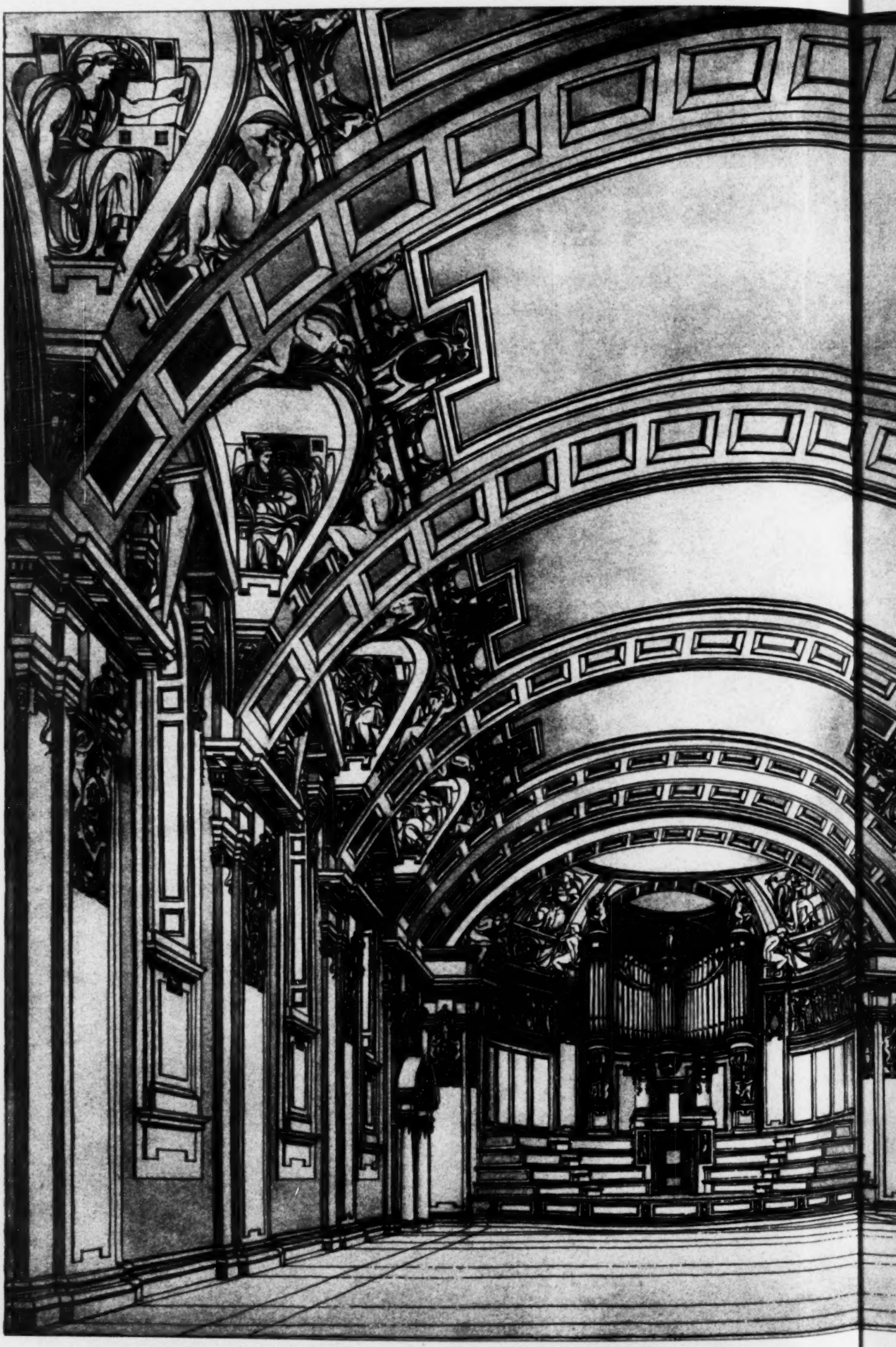


"THE ASSUMPTION": PAINTING FROM THE CHURCH OF THE HOLY ROSARY, MARYLEBONE ROAD

By Mr. N. H. J. Westlake

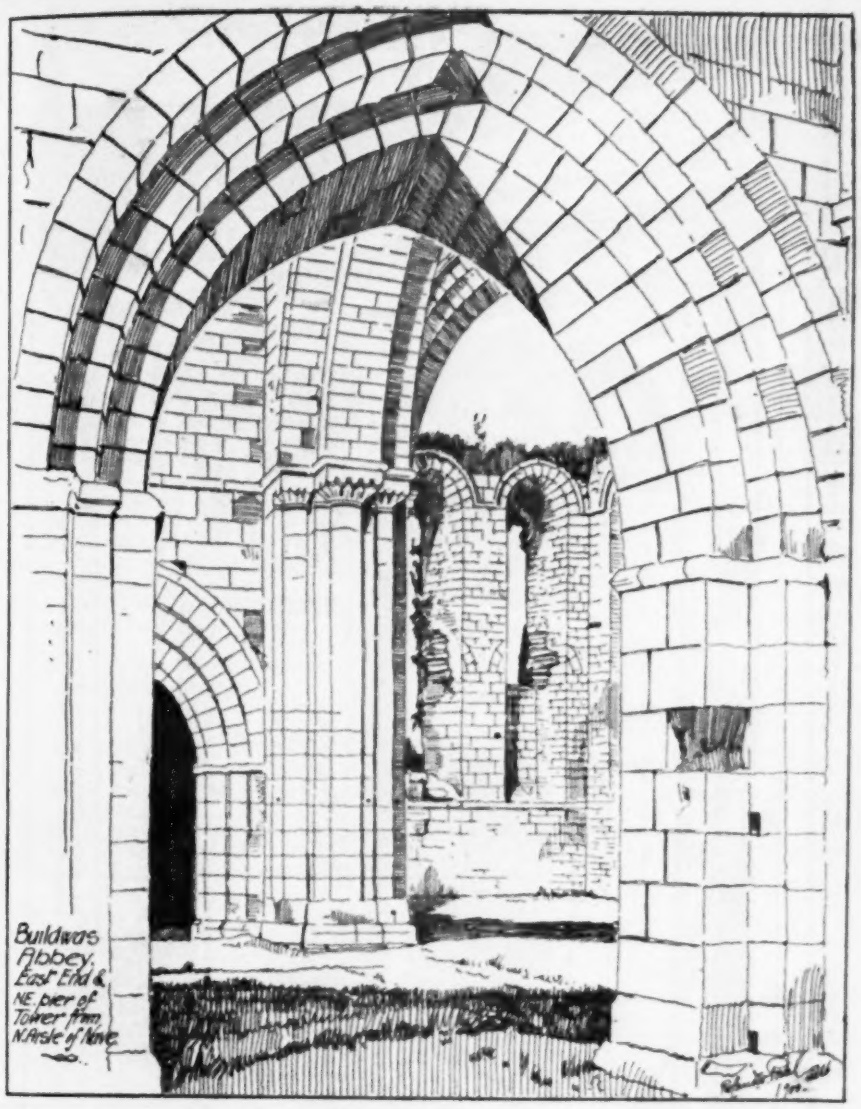


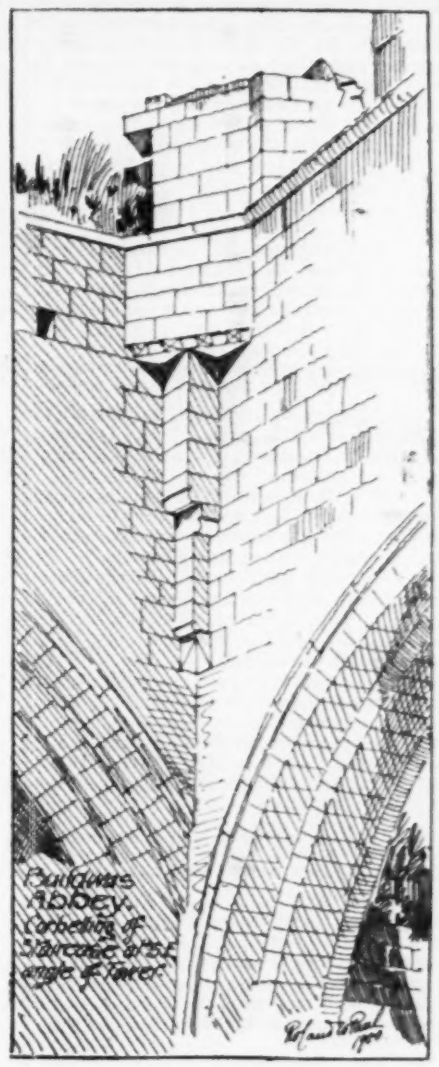
WALSALL MUNICIPAL BUILDINGS. INTERIOR

MR. J. GLENN GIBSON, A.R.I.B.A.

HALF-PHOTO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

INTERIOR OF TOWN HALL AS PROPOSED.
BSON, A.R.I.B.A., ARCHITECT.





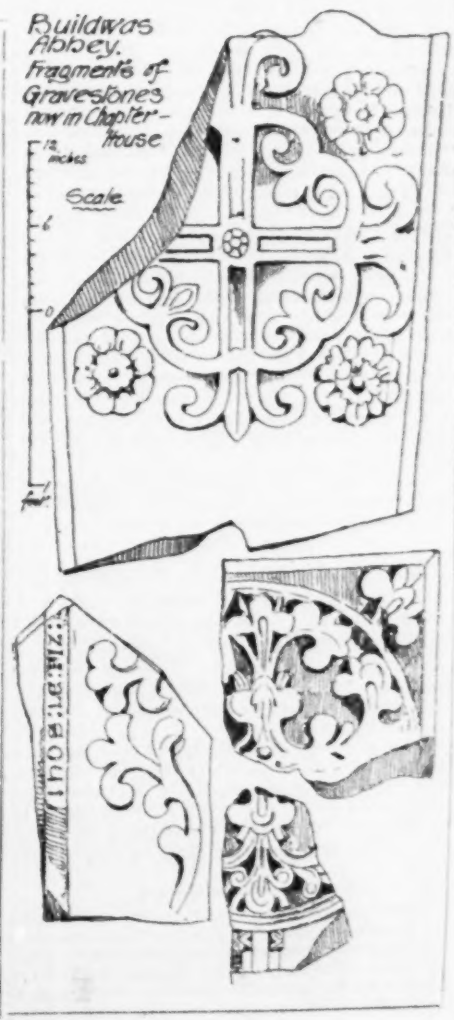
to these screen walls there are several traces in the columns on the sides towards the aisle of screens crossing the latter at intervals. On the south side there appear to have been three such screens, and on the north side two. These are shown on the plan. Screens were also placed in the arches leading from the aisles to the transepts, and the two outer chapels of the transepts have been similarly enclosed. Against the inner face of the west wall of the nave below the windows are a series of holes for beams, and with these correspond holes in the westernmost pair of columns. Some wooden erection—possibly a gallery—was evidently placed here, but for what purpose is not clear.

The church appears to have been lighted entirely by round-headed lancets. The eastern face of the presbytery had two tiers of triplets; although the intermediate cill has been broken away, the springers of the arches of the lower tier are still visible (see sketch). On the south side of the presbytery are piscina, aumbry, and three sedilia, the latter an insertion of Early English date, with delicate mouldings and dog-tooth ornaments on the arches and caps. There are traces of a piscina in each of the transept chapels. Attention should be given to the corbels of the east and west arches of the "crossing," and the way in which the labels of the nave, arcade, and abacus of the cap are stopped.

The west front, north side, and east end are now thickly covered with ivy. The general view has, therefore, been taken from the south side looking across the church into the north transept. In the columns of the nave are seen the marks of the screens already described, the various irregular holes in the south arcade for the woodwork of the aisle roof, and the places for wooden plugs for fixing the stalls against the wall below the west arch of the "crossing." Through the arches at the east end of the nave and in the transept are seen the arches of the north transept chapels and the north-east angle of the presbytery, while behind the nave arcade are the doorways to the "slypes" and one of two windows flanking the doorway to the Chapter House.

The Chapter House is a rectangle, a little over 40 ft. in length by 30 ft. in breadth, divided into nine compartments by four slender columns, two being circular and two octagonal in section. At the west end is a doorway of three orders flanked by windows; at the east end are three lancets, and on either side in the easternmost bays are two others. The Chapter House stands between two vaulted passages, or "slypes," that between it and the church probably led to the monastic cemetery, while that to the north led to the buildings situated immediately north of it, and probably included the Abbot's House and the infirmary.

North of the "slype" is what appears to have been a vaulted space 40 ft. long and 27 ft. wide, its east wall pierced by three pointed arches of an unequal span. It had a doorway in its south wall leading to the "slype," and another in the opposite wall leading to the buildings on its north side. On the east the southern arch led into a building one story in height (running east and west), the gable of which is to be seen against the wall, and the other two arches opened apparently into a court 26 ft. in width (north and south) and of uncertain length. The north wall of this court was formed by what apparently was the wall of a large building with two aisles, with an arcade of seven bays dividing them. So far all the buildings described have been Transitional Norman, but this building is Early English, with most acutely-pointed arches and moulded capitals. It measured, when complete, 100 ft. in length, and had an entrance in its eastern wall. This wall is in line with the west wall of the present house (which forms the eastern boundary of the court already referred to). The house is, or was in Potter's time, L-shaped in plan, the south wall having blocked-up Early English windows, and some of the other outer walls apparently ancient; but the whole building, even in his time, was a medley, and largely post-Reformation, with fragments of earlier work from destroyed buildings worked into it.



At its south-west angle is a building, post-Reformation in date, locally known as the "Chapel." In the south wall is a blocked doorway with early carving over it, and the probability is that the whole of the south side of this "Chapel" is original work, and is a continuation of the wall of the building of one story on the south side of the open court. To the south is a square apartment, but the age of this and the wall connecting it with the north-eastern angle of the Chapter House is uncertain.

The few fragments of monuments found have been placed in the Chapter House. The chief are the three here illustrated—portions of gravestones with floriated crosses of thirteenth-century date. One has the fragment of a marginal inscription in Lombardic characters still remaining :—

IHOS : LE : FIZ :

In the floor of the Abbey House are a large number of encaustic paving tiles. One bears the arms of Dispencer, and there are several with figure subjects.

At a short distance south-west of the church are fragments of wall, which appear to indicate the site of the gatehouse and a portion of the outer boundary of the abbey precincts.

A photograph of the interior of the church, looking east, was reproduced in the *Builder*, August 15, 1891, in illustration of the Architectural Association's visit to Shrewsbury, which, together with the general view now published, will give a fairly complete record of the general design and the traces of the screen walls already described.

The dedication of the church was to St. Mary and St. Chad. The abbeys of St. Mary, Dublin, and Ystrat Marchel (Montgomeryshire) were subject to Buildwas.

DECORATIVE PAINTING: "THE ASSUMPTION."

Over the High Altar of the Church of the Holy Rosary, in Marylebone-road, there have been recently painted, by Mr. N. H. J. Westlake, three subjects illustrating the dedication of the church. The "Assumption" and "Coronation" are two; the third represents the Virgin revealing the Method of the Rosary to St. Dominic.

We gave some notice of these paintings when they were first executed, a few months ago. The figures in the three subjects are of life-size, and are accompanied in the scheme of decoration by other figures of lesser scale, *e.g.*, in the panels of the roof, which contain a series of angels holding the versicles of the "Pange Lingua."

As a subject for artistic treatment an "Assumption" differs from an "Ascension," in that in the latter case our Lord is represented as rising by His own power, in the former the Virgin is "assumed" by a superior power. The subject is of great antiquity, both in the Eastern and Western Churches. In the former it is usually associated with the death of the Virgin, whose dead body lies on a couch below, whilst her soul is carried above in the arms of our Lord. In the Western Church the rising figure is often represented, by the great Masters, as over the tomb, which is full of flowers. In the fifteenth century in England it was a common subject in stained glass, and there is a fine window illustrating the subject at Fairford.

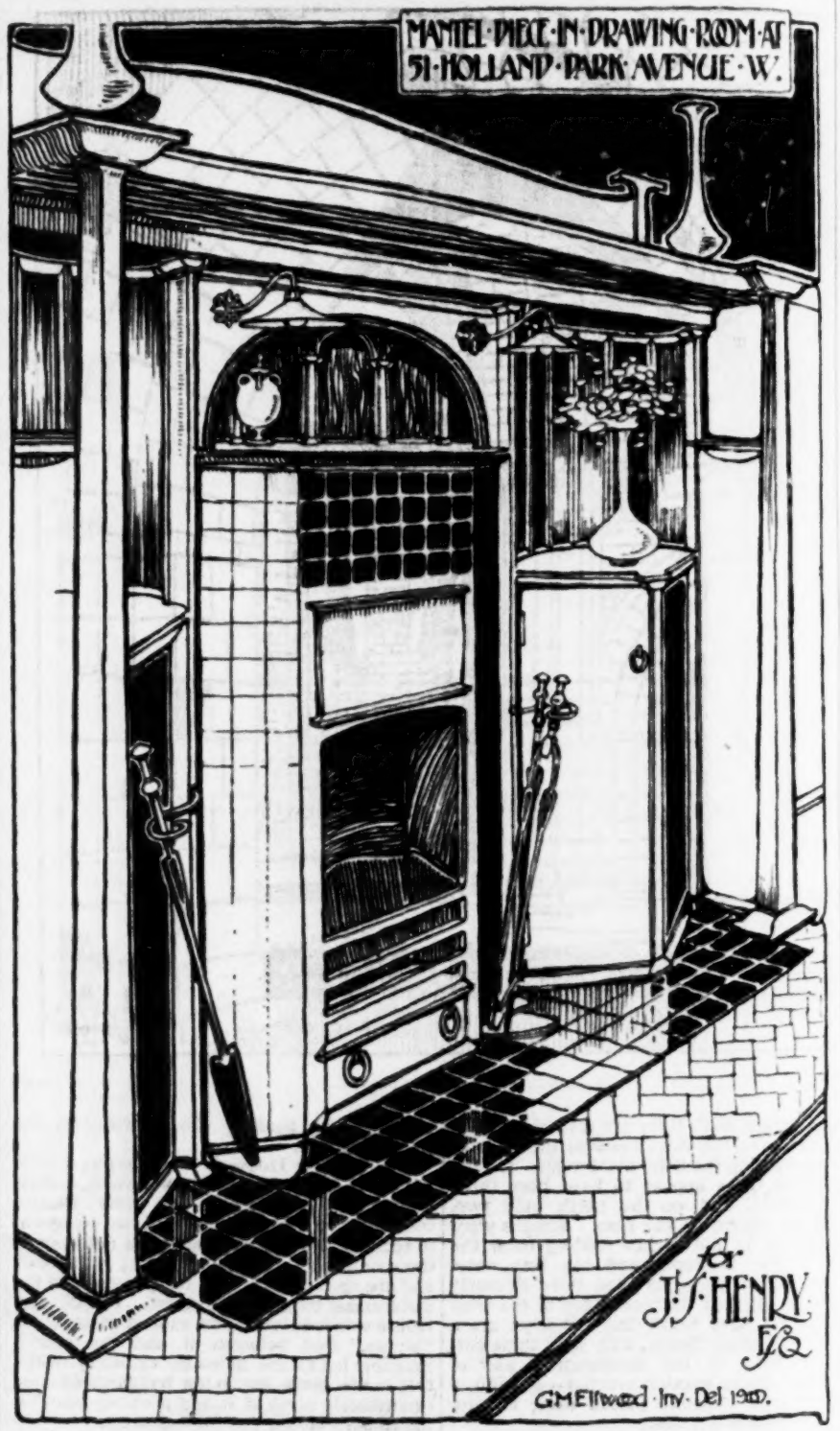
Mr. Westlake's picture omits the accessories of the tomb, and only shows the figure of the Virgin surrounded by adoring angels.

WALSALL TOWN HALL: INTERIOR OF HALL AS PROPOSED.

The view here given represents the interior of the Walsall Town Hall, as proposed in the design by Mr. J. G. Gibson, to which the first premium has been awarded in the competition, and which is to be carried out without further delay.

The drawing here illustrated was not submitted in the competition, because washed drawings were excluded, but it shows the manner in which the interior of the hall is to be treated. The actual competition drawings, or a portion of them, we shall be able to illustrate shortly.

The London Sketch Club.—The private view of the fifth exhibition of sketches by the members of the London Sketch Club will be held on Saturday, the 13th instant, at the Modern Gallery, 175, Bond-street, W., and the exhibition will be open to the public from the 15th to the 27th inst, inclusive.



DESIGN FOR DRAWING-ROOM MANTELPIECE.

This design, by Mr. G. M. Ellwood, is reproduced from a small black-and-white drawing which was hung in the last Royal Academy exhibition.

It is an interesting example of design which is elegant without losing simplicity.

COMPETITIONS.

Cardiff Borough Asylum.—The assessor in the preliminary competition, Mr. G. T. Hine, has selected six architects to engage in the final competition; viz., Messrs. Wills & Anderson (Swansea), J. Kirkland (Clapham Park), Greenaway & Newberry (Westminster), Law & Allen (Arundel-street, Strand), Hooley & Sander (Nottingham), Oatley & Skinner (Bristol). According to the report in the *Western Mail* the assessor stated to the committee that he had examined the whole of the fifty-one sets of designs, and had selected six of the designs which showed the greatest merit, and were most likely to meet with the approval of the Commissioners in Lunacy. Two of the authors had gone to work on very modern lines, and he thought it would be worth while considering whether they should not, in issuing the new instructions, allow architects to work on those lines. The general principle he referred to was the inclusion of a detached hospital for the reception of patients, so that in being first admitted they would not go to the asylum at all, but to the hospital, where cases would be examined and diagnosed, and if there was any chance of a cure the patient would stay there until he was cured, and would never enter the asylum. To have been placed in an asylum was taken to be a stigma, and if they did as he suggested they would go a long way towards curing lunacy. The six estimates varied from 195,000*l.* to 226,000*l.* for 800 patients, and from 224,000*l.* to 296,000*l.* for 1,250 patients. The estimates were, if anything, under the mark.

Memorial to Robert Pollok, near Glasgow.—A memorial to Robert Pollok, which has been erected at the point where the Old and the New Kilmarnock Roads unite a few hundred yards from Logan's Well, ten miles south of Glasgow, was unveiled on the 24th ult. The memorial is built of grey granite, and on the front there is a panel of the poet in bronze. The work was executed by Mr. A. M'F. Shannon, Glasgow.

The Student's Column.

LESSONS IN ELECTRICAL ENGINEERING.

13. Testing Electric Wiring—Rules and Regulations in Force — Measuring Leakage.

When a house has been wired for the electric light it is necessary to make certain electrical tests to find whether the mains are properly insulated from one another and from earth. When the supply is got from a public company, the company's inspector always tests the insulation resistance of the house wiring from earth before he connects it to the supply mains. We have seen already when considering systems of distribution that the pressure of one of the supply mains may be considerably higher than the declared pressure at the consumer's terminals. For example, if the public service is a three-wire 200 volt service then the pressure of the positive outer to earth is often greater than 300 volts. Unless, therefore, the insulation resistance of the network of wires, switchboards, fuse-blocks, &c., throughout the house be fairly high, there may be a continual leakage of electric current going on which is not only annoying to the company but may, owing to the fire risk, be a source of danger to the householder.

It must be remembered that this insulation resistance to earth is only a partial test of the quality of the wiring. If the house be damp, then the insulation resistance will probably come out low, no matter how carefully the wiring has been done. On the other hand, if the house be dry, then the insulation resistance may come out very high, even although the materials used be of poor quality and the joints be made in the most careless manner. For this reason, perhaps, contractors are in the habit of speaking slightingly of insulation tests, although it is absolutely necessary that such tests be made. Another reason why insulation tests are not more highly appreciated is because few people know how to make them properly, and no clear instructions on this point are given in any code of rules.

The forty-first of the Board of Trade Regulations for the security of the public from bad and inefficient supply of the electric light is as follows:—

"The undertakers shall not connect the wires and fittings on a consumer's premises with their mains unless they are reasonably satisfied that the connexion would not cause a leakage from those wires and fittings exceeding one ten thousandth part of the maximum supply current to the premises; and where the undertakers decline to make such connexion they shall serve upon the consumer a notice stating their reason for so declining."

This is usually taken to mean that if V be the declared pressure at the consumer's terminals, and R be the insulation resistance to earth of the house wiring, then $\frac{V}{R}$ must be less than the ten thousandth part of the maximum supply current. $\frac{V}{R}$ is, however, a purely imaginary current. To make this clear we must consider the elementary theory of the subject.

Suppose that the house is wired on the two-wire system, then one of the house mains is connected to one of the mains of the supply company and the other is connected to another main. The house mains are thus kept at a constant difference of pressure from one another, and also at constant differences of pressure from the earth. For example, the difference of pressure between the mains may be 200 volts, the pressure between earth and one of the mains may be 300 volts, and between earth and the other main may be 100 volts. In practice we shall have a series of paths along which leakage is taking place. We shall have leakage across switches, for example, from one main to the other, even although these switches are absolutely insulated from earth, the driving pressure in this case being 200 volts. Again, we shall have leakage across the insulation of the mains to earth, the driving pressure in one case being 300 volts and in the other 100 volts. In order then to get an accurate idea of the fire risk, we must measure the leakage currents flowing through these various paths, and we must also take into account the voltage driving these currents. Suppose that we had leakage currents of one-tenth of an ampere each, flowing from the high-pressure main (300 volts) direct to earth, from the high-pressure main to the low-pressure main across the switches, and from the low-pressure main direct to earth, then the watts expended in the high-pressure leak would be 30, in the leak between the mains 20, and in the leak in the low-pressure main 10. Now these watts measure the risk of fire much more accurately than the insulation resistances do, hence the leakage watts are what we ought to take into account. In order to find the leakage watts or the leakage currents, however, we must first find the various insulation resistances.

Let x and y denote the "fault" resistances of the two mains A and B respectively (fig. 1).

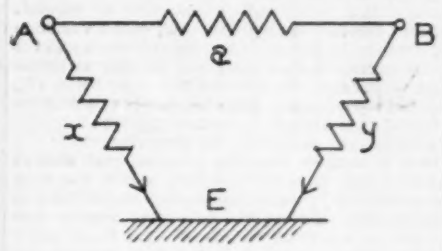


Fig. 1.

By the fault resistance of a main and all conductors in metallic connexion with it we mean the insulation resistance of that main to earth if the other main and all conductors connected to it were removed. The insulation resistance of the network to earth is $\frac{xy}{x+y}$, and this is what supply companies ordinarily measure. The leakage current to earth from the high pressure main will be $\frac{300}{x}$, and from the other main it will be $\frac{100}{x}$. The leakage watts in the two cases will be $300\frac{300}{x}$, and $100\cdot\frac{100}{x}$ respectively. In addition, we shall have leakage currents between the mains that never pass through earth at all. Let a be the resistance of this path, then the leakage current and watts will be $\frac{200}{a}$ and $200\cdot\frac{200}{a}$ respectively.

BOOKS RECEIVED.

The Book of Sun-dials.—By Mrs. Alfred Gatty. Enlarged and re-edited by H. K. F. Eden and Eleanor Lloyd. (G. Bell & Sons.)

Archæological Survey of Egypt. Eighth Memoir. The Mastaba of Ptahhetep. By N. de G. Davies. (Kegan Paul & Co.)

Injectors, their Theory, Construction, and Working. Second edition. By W. W. F. Pullen. (John Heywood.)

Defects in Plumbing and Drainage Work. By Francis Vacher. New and revised edition. (John Heywood).

GENERAL BUILDING NEWS.

Mission Church, Sparkbrook, Worcestershire.—The foundation-stone was laid recently of a Mission Church in Walford-road, Sparkbrook. Only a portion of the church is now being erected. When completed the building will accommodate over 700 persons. Mr. W. Hawley Lloyd is the architect, and Messrs. J. Moffat & Son are the builders.

Wesleyan Chapel, St. Leonards-on-Sea.—Memorial-stones were laid on the 26th ult. of a Wesleyan chapel at St. Leonards-on-Sea. The building will be 76 ft. in length and 47 ft. in width, and will accommodate about 600 persons. Mr. James Weir is the architect, and the builder is Mr. W. G. Morgan. The contract price is over 4,500*l.*

Boulevard Congregational Church, Nottingham.—The Congregational church which has been erected on the Gregory Boulevard, Nottingham, was opened on the 27th ult. The building is of Bulwell stone. Beneath the church is a Sunday-school room. The cost has been about 4,900*l.* Mr. H. Gill was the architect, and Mr. W. Maule the builder.

Restoration of St. Paul's Church, Bristol.—A scheme is on foot to restore and re-seat St. Paul's Church, Portland-square, Bristol. According to a local newspaper, it is proposed to re-floor and re-seat the whole of the nave and aisles, to remove the side galleries, reconstruct the west end gallery, provide new heating apparatus, and decorate the interior of the church. It is estimated that the cost will be about 1,400*l.* Mr. G. H. Oatley is the architect.

Primitive Methodist Church, West Bromwich.—On the 26th ult. a new church, erected in the Lyng, West Bromwich, was opened. It is designed to accommodate some 650 people, and cost 5,300*l.* Mr. A. Long was the architect.

Holy Trinity Church, Melrose, N.B.—The new chancel of this church, together with the north and south transepts, which have just been built at a cost exceeding 2,500*l.*, was recently consecrated by the Bishop of Edinburgh. The old church now forms the nave, and the chancel is the same breadth as the nave. The transepts are divided from the church by tracery arches, supported by a single column. The architects are Messrs. Hay & Henderson, of Edinburgh.

National School, Dundonald, Ayrshire.—The foundation-stone of a National School was laid at Dundonald on the 22nd ult. Mr. Adam Burrows is the builder, and Mr. Frazer is the architect.

Technical School, Bootle.—The new Municipal Technical School at Bootle was opened on the 27th ult. The building occupies a site at the corner of Balliol-road and Pembroke-road, the principal frontage being to the former thoroughfare. The school is grouped round a large quadrangular court. The front and sides of the quadrangle are two stories in height. The entrance is central in the main front to Balliol-road, and leads into a hall, round which are grouped the administrative offices, and from which lead the main corridors serving the whole school. The assembly hall for lecture and examination purposes is directly opposite the entrance. The west wing is occupied by the women's manual training department, consisting of rooms for a laundry class and a cookery class. The east wing, in addition to three ordinary classrooms for thirty, forty, and thirty-six students respectively, contains the physical department. The latter consists of a laboratory accommodating about forty students, and lecture theatre for the same number, with preparation and dark room. Special precautions have been taken to render this portion of the building as far as possible free from vibrations, &c. The workshops occupy the north side, and include a carpenter's shop, a metal-working shop, and a plumber's shop. The power for driving the necessary machinery in these shops will be derived from an eight h.p. electric motor, the current being obtained from the Corporation mains. In the basement is a boiler for general heating purposes, and a smaller vertical boiler for supplying hot water to the chemical and physical departments, and also the lavatories and sinks throughout the building. Two stone staircases in the front or main corridor lead from the ground to the first floor. The main front in Balliol-road is occupied by the Art School, and contains elementary and advanced rooms, modelling-room, library, and art master's room. These rooms have north lights. The west wing is devoted to the chemical department, consisting of a laboratory with balance-room, lecture theatre for forty students, and a preparation-room. The east wing contains three classrooms, accommodating respectively thirty, forty-two, and forty-eight students, and an engineering drawing classroom for forty students. The heating of the building is effected with low pressure hot water radiators. The fresh air is admitted to the rooms partially through radiators, and also through special wall inlets. The vitiated air is extracted at the ceiling level, and is conveyed along ducts to the main upcast shafts, in which are fitted electric exhaust fans. The building is lighted throughout with electric light, the installation having been made by Messrs. Brook, Hirst, & Co., of Chester. The materials used for the building were Ruabon and red bricks, with Knowsley stone dressings, the roof being covered with Westmoreland green slates. Messrs. Best & Callon were the architects, and Mr. Corkhill, of Liverpool, was the contractor. The contract amounted to 20,065*l.*

Workhouse, Southmead, near Bristol.—The foundation-stone was recently laid of the workhouse which is being erected at Southmead for the Barton Regis Union. The site is on the Southmead-road, and contains 13½ acres. The buildings are divided into five blocks. There are boardroom and clerk's offices, male and female tramp wards, with porter's lodge, stoneyard, &c., master's and matron's department, and a married couples' block. At the rear of the pavilions are the laundry, workshops, boiler-house, &c. The infirmary ward has accommodation for twelve males and twelve females, in three separate divisions. There is also a mortuary and stables. The buildings have been designed by Messrs. W. H. Thorp, of Leeds, and A. P. I. Cotterell, of Bristol. The contractors are Messrs. Forse & Sons, of Bristol, and the boundary walls are being erected by Messrs. W. & J. Bennett, of Bristol.

Aston Union Cottage Homes.—These homes were formally opened on September 20. They are planned so as to suggest the idea of a self-contained village. The entrance is from Fentham-road, Gravelly Hill, by a pair of recessed wrought-iron gates leading to an avenue or carriage-way 30 ft. in width, on each side of which is a large front-garden to every block of building. The aspect of the avenue is due north and south, so that sun shines on the homes and all buildings the whole of the day. On passing through the entrance-gates, on the left is the porter's lodge and probationary ward for eight boys and eight girls, with dispensary, consulting-room, lavatory, and baths, dayrooms and dormitories, &c., for each sex. Close to the

entrance is a weighing machine for the purpose of testing all bulky goods which go into the houses. On the left are homes for girls, on the right those for boys; in the centre, for purpose of central convenience and inspection, is the superintendent's house. At the end of the avenue is the infirmary, on its left the church and schools, and on its right the workshops, laundry, washhouses, and swimming-bath. Opposite the superintendent's house in the centre of the avenue is a clock-tower, specially designed by the architects and the gift of Mr. W. J. Adams, Chairman of the Building Committee. The homes are designed to accommodate twelve or sixteen of each sex; in some cases they are double or semi-detached. Each home contains spacious entrance-hall, 12 ft. wide dayroom, kitchen, and dining-room, scullery, larder, pantry, cleaning and boot room, bathroom, lavatory, and dormitories, with accommodation for foster-parents. At the rear of each home is an asphalt playground. At the rear of the superintendent's house is a tennis-lawn or bowling-green for the use of the superintendent and foster-parents. There is a church to seat 400 people. The east and west windows were presented by the architects and builders respectively. The infirmary is on the pavilion system, and is fitted up with every modern requirement. It has convenience for twelve boys and twelve girls, with wards for eight, and a separation ward for four, to each sex, with nurses' duty-rooms between. There are dayrooms for each sex, and also bathrooms, with nurses' rooms, kitchen, stores, scullery, &c. This building is elevated and terraced all round. A mortuary at the rear completes the building. The workshops are arranged round an oblong paved yard, and comprise washhouses, drying-closets, laundry, engine and boiler house, cart-shed, carpenters', fitters', shoemakers', and tailors' shops. Under this yard is a tank for collecting the rain water for economic reasons. Adjoining is a swimming-bath, 50 ft. by 20 ft. The buildings are designed with a view to obtain, as far as possible, with the assistance of foliage a village-like appearance, but with as little woodwork as possible, so as to reduce the cost of maintenance in the future to a minimum. The architects, whose plans were chosen in open competition, are Messrs. Franklin, Cross, & J. R. Nichols, of Birmingham, and the builders Messrs. Wm. Lee & Son, of Aston. The cost of the buildings is about 50,000*l.*, and of the entire scheme about 61,000*l.*

Holy Trinity Church, Llandrindod Wells.—The rapidly increasing numbers of summer visitors demands a further enlargement of this church, and a scheme is on foot by which accommodation for 1,600 persons will be provided. It is proposed to build double north and south aisles, a north chapel, and to lengthen the present chancel. On the south side of the chancel a vestry with sacristy over is contemplated. The nave roof is to be raised so as to dominate the new aisles, and a parish room is suggested under the outer north aisle. A tower and spire about 135 ft. high in the south-west angle of the church, with a baptistry within the piers, will complete the building. About 15,000*l.* is required for the whole of the work, and the north aisles will probably be commenced forthwith. The architect is Mr. R. Wellings Thomas, of Llandrindod Wells. An alternative scheme, as regards the south aisles, is to take down the present south nave arcade and rebuild it so as to widen the nave considerably, and only build one south aisle, rather larger than the north aisle. The present north and south aisles are very small.

Primitive Methodist Chapel, Burton-on-Trent.—This chapel, situated in Welmore-road, is about to be enlarged and altered. It will be increased in length, and at the back there will be a new block of classrooms, with vestry, copper-house, and lavatory accommodation for the schools. The front will be entirely remodelled, and will have a new entrance porch with a large four-light window above and two-light windows on each side. The walls are to be faced with red bricks, having stone windows, gable, and coping. The architect is Mr. Thomas Jenkins, of Burton-on-Trent.

Church Hall, Builth Wells.—A new church hall, erected at Builth Wells, was opened on the 26th ult. The building, adjoining the north-west corner of the churchyard, and bounded on the north and west by Park-road and Church-street, is designed with free Gothic treatment, ornamented by square-headed windows, transoms and mullions; the walls being dressed with Llanelwedd stone. The cost of the building was about 950*l.* The builder was Mr. J. M. Jones; the painting, staining, and varnishing were finished by Mr. W. E. Dixon, of Builth; and the gas-piping and fitting, &c., by Mr. S. G. Tulk. The architect was Mr. Telfer Smith, of Builth Wells.

Business Premises, Dublin.—One of the largest establishments in the United Kingdom for the manufacture of ice and the provision of cold storage has recently been finished in Mill-street, Dublin, at a cost of 20,000*l.* The factory is now in working order, cooling 56,000 cubic feet and manufacturing 175 tons of ice weekly. The storage capacity for ice reaches 3,000 tons. The works are on the site of what was known as the Warrenmount Mills. The architect was Mr. F. W Higginbotham, and the contractor Mr. H. J. Monks, of Dublin. The electric lighting was carried out by Messrs. Handley & Shanks, of the same city.

A Year's Building in Glasgow.—In his valedictory address on the 27th ult. to the Glasgow Dean of Guild Court, Sir James Bell, Bart., the Lord Dean of Guild, reviewed the work for the year ending August 31 last. According to the *North British Mail*, he stated that from 1890 until 1897-98 there was a steady increase of linings granted for houses and shops. The demand for this class of buildings seemed to have been very great up to the year 1897-98, but since then there had been a steady decline of roughly nearly 300,000*l.* per annum. Last year they had in valuation only about half what they had in 1897-98. Under the heading of public buildings an increase was shown in the number of linings from five to eight, but a fall in the money valuation of from 144,400*l.* to 42,500*l.* Churches, halls, and schools showed an increase in both numbers and valuation. Twelve linings last year, with a valuation of 88,680*l.*, against fourteen linings this year, with a valuation of 106,050*l.* A feature of last season's work was the great increase in the valuation of warehouses, shops, and workshops, the number last year being 113, against 115 this year; while the money valuation increased from 516,490*l.* last year to 757,870*l.* this year. Additions and alterations to properties, while 104 fewer in number than the previous year, showed about 3,000*l.* more in valuation, which was fully accounted for by the increased price of material and wages paid. During the past year twenty new streets were granted linings of 5,722 lineal yard's. Taking the total number of linings granted last year, the numbers were 536, with a valuation of 1,900,428*l.* In regard to the building of houses and shops, the Queen's Park district showed the greatest activity, the number of linings granted there being thirty-two, with a valuation of 233,050*l.* In this division only three houses were of one apartment, 107 of two apartments, 165 of three apartments, ninety-eight of four apartments, sixty-one of five apartments, and fifty-nine of six and upwards. The Eastern Division came next in the number of linings and valuation. The linings were seventeen in number, with a valuation of 126,867*l.*, but in this division there were 132 of one, 360 of two, 121 of three, and only twenty-eight of four rooms and upwards. Maryhill Division was third in the list, with a valuation of 109,700*l.* for fourteen linings, that included forty-two one-roomed houses, 161 two-roomed houses, twelve of three rooms, twenty-two of five, and forty-six of six rooms and upwards. The St. Rollox Division, the fourth in the list, showed a large number of one-roomed houses. The linings were ten in number, with a valuation of 49,850*l.* These covered 272 houses of one apartment, 412 of two apartments, fifty-five of three apartments, and only six of four rooms and upwards. In the Central Division there were only two linings granted for shops and houses, with a valuation of 46,400*l.* In the Western Division two, with a valuation of 44,000*l.* In the Northern, four, with a valuation of 39,500*l.* A very large proportion of the additions and alterations, with a total of 298 linings and a valuation of 344,641*l.*, has been occasioned through the coming into force of the various Health Acts of the City of Glasgow.

SANITARY AND ENGINEERING NEWS.

Sewerage Works, Morecambe.—The foundation-stone of the central pumping station in connexion with the sewerage scheme now being carried out at Morecambe was laid on the 26th ult. The contractors for the works are Messrs. J. Schofield, Son, & Co., of Leeds, and Mr. Tempest, who is executing about 870 yards of tidal storage culverts. Messrs. Beesley, Son, & Nicholls are the engineers.

Water Supply, St. Helens, Lancashire.—On the 27th ult. the foundation-stone was laid of a pumping station, which is being erected at Melling, near Ormskirk, in connexion with the water supply of St. Helens. The building and the engines were designed by Mr. J. J. Lackland, the Water Engineer to the borough. Two boreholes of 560 ft. deep have been made by Messrs. Timmins & Sons, of Runcorn, and the water will be pumped from the wells through an 18-in. main to the 21-in. main at Kirkby, two miles away, and thus on to St. Helens. The pumping engine is to be of 200 h.-p., the steam being generated by high-pressure Lancashire boilers, and is being constructed by Messrs. Robinson & Cook, of St. Helens.

Water Supply of Windsor.—In a recent report to the Local Government Board, by Dr. H. T. Bulstrode, it is stated the shallow wells at Windsor, referred to in the report of Sir John Simon as existing in the borough at the date of the typhoid epidemic in 1858, have now, through the praiseworthy action of the Town Council, almost entirely disappeared, and the district is at present supplied from the waterworks belonging to the Corporation and situated at Eton. These waterworks were acquired by the Corporation from the Windsor and Eton Waterworks Company, under the powers conferred by the provisions of the "Windsor Corporation Water Act, 1884." The water is derived from wells situated near to Eton College, most of them on an island known as Tangier Island. Three of the four wells now in use are cut off from the mainland by means of a stream or streams. These wells are 26 ft. to 28 ft. in depth, the greater portion of this depth being sunk in the river gravel, which hereabouts overlies the chalk. This gravel, which is of a somewhat fine character, is said to be 20 to 24 ft. in depth. Each well is some 8 ft. in diameter, and is lined internally by cast-iron cylinders. These cylinders, with the exception of the uppermost, are all perforated in such a manner as to allow of, or rather to encourage, the gravel-water entering the wells. Owing to the increased demand for water, an attempt was made a few years ago to bore down into the chalk at the bottom of well No. 2, but, although 135 ft. 6 in. of chalk was perforated, the additional yield of water was practically *nil*, a fact which would in itself appear to militate against the probability of there being fissures in the chalk hereabouts. In consequence of the failure to procure an additional supply from this source well No. 4 was sunk, and the total supply is now sufficient for the present needs of the district. Above the level of the uppermost iron cylinder, which is not perforated, and which reaches to within a few feet of the surface, the walls are lined with bricks set in cement, but in well No. 3 there is a considerable area covered with concrete. The top of the wells has been raised above the level of the surrounding ground in order to prevent the entrance of river water during times of exceptional flood in the Thames valley; for instance, in 1894 the water actually overflowed into certain of the wells. There is no provision for storage, the water being pumped direct into the mains, nor is any filtration considered necessary. The Resident Engineer has advised the provision of a storage tower, and he points out that there is no storage available in the event of fire. The pumping power is furnished partly by a water wheel, partly by turbines, and partly by steam-engines. These latter are only used when the head of water in the river is insufficient to drive the turbines. Up to last summer there appears to have been some difficulty in maintaining sufficient pressure in the higher mains during periods of excessive street watering or other exceptional demands, and during last summer the higher parts of the town were at times not adequately supplied during the presence of an exhibition which made large demands on the supply. This disadvantage has been now overcome by the provision of a new and powerful engine. The Corporation now supply a population of about 20,000 in Windsor, Eton, and Clewer, the daily supply being at the rate of about 35 gallons per head. Windsor Castle is in the main supplied by its own waterworks, which are situated near Romney Lock, but the Dean's and Canon's residences and the Horseshoe Cloisters, which form part of the Castle, are supplied by the Corporation.

Waterworks, Aboyne, Aberdeen.—The works in connexion with the water-supply and drainage for the south side of Aboyne were opened on the 29th ult. The water-supply comes from the Greenloch Springs, which are situated at the back of the Brackloch Craig. From the collecting-tank near the springs the water is conveyed for over a mile in fireclay pipes, following the contour of the hill to a cistern behind Birsemore Hill. This cistern has a capacity of 30,000 gallons. From it the water is conveyed in iron pipes to the various holdings, a distance of over two miles. From the Greenloch Springs to the houses there is a fall of between 500 ft. and 600 ft., and from the cistern to the houses a fall of about 300 ft. The sewerage works are also complete. The contractors were Mr. Wm. Pirie, Aberdeen; and Messrs. Sellar & Co., Aberdeen (cement work). Mr. George Chalmers, Aberdeen, was clerk of works; and Mr. George Bennett Mitchell was the engineer.

FOREIGN.

United States.—The output of all the Portland cement mills in the United States is now estimated at over 4 000,000 barrels per annum. It is said that during the last twenty years English brands generally have lost in favour, whilst at the same time the popularity of German cements, and one or two of French and Belgian make, has steadily increased. Of last year's importations, a little over 2,000,000 barrels, more than half was of German origin, English cement forming only one-tenth of the entire amount.——The rule is to be enforced requiring that all buildings in New York which exceed 150 ft. in height are to be equipped with stand-pipes, and the couplings will have to be of the standard used by the fire department. It is estimated that 60 per cent. of the high buildings do not conform to this rule.——The American School for Oriental Study and Research in Palestine is to commence its work in a few weeks, starting at Jerusalem. The object of the school is to afford advanced students, from American institutions of learning, the opportunity of prosecuting investigations relative to history (both sacred and secular), archæology, and kindred subjects, and especially to explore and excavate historic sites. The idea is to follow at Jerusalem the examples already set by the schools at Athens and Rome.

Australia.—Considerable dissatisfaction has been created amongst Melbourne architects in regard to the competition for the Central Railway Station there. At the end of May, 1899, it was decided, on the recommendation of the Victorian Railways Standing Committee, to call for competitive designs

for the proposed station, and premiums of 500*l*., 200*l*., and 100*l*. were offered for the three best designs for a building and roof, the total cost of which was not to exceed 102,000*l*. As the time fixed for sending in the plans was short, a number of architects at once set to work to try to complete within the time, only to find that, when approaching completion, the period within which the plans could be sent was extended by some months. This was resented, principally on the ground that it gave time for other competitors to join in. An expert board was appointed to select the prize designs, and the awards were duly made, without the Standing Committee being given an opportunity of discussing the merits of the awards. This was at the beginning of June last. The competitors were under the impression that the committee was finally to decide which was the most suitable design. Although some months have elapsed, the premiums were not paid when the last mail advices left Melbourne, as neither the railway department nor the Committee cared to accept any responsibility in the matter. The estimated cost of the building, following the three selected designs, is 102,000*l*., 116,247*l*., and 80,120*l*. respectively, but if stone be employed the cost will be considerably enhanced. Several Victorian architects appear to be under the impression that the conditions laid down originally as to cost have been disregarded in making the awards.——Competitive designs for the Hobart post and telegraph office have arrived in Melbourne, and were to be adjudicated upon by Messrs. Percy Oakden, Anketell Henderson and Thomas Watts.——The question of erecting new law courts in Chancery-lane, Sydney, on the site now occupied by the Equity and District Courts is being considered by the Minister for Justice.——The plans of the new town hall at Eaglehawk, Victoria, have been approved by the Borough Council. Messrs. Wilkinson & Permewan are the architects.——The death is announced of Mr. Lloyd Tayler, F.R.I.B.A., president of the Royal Victorian Institute of Architects. Amongst the numerous buildings in Australia of which he was the architect may be mentioned the residence of the late Hon. James Service, at St. Kilda; warehouse for Messrs. James Service & Co.; the Exchange, Melbourne; the Australian Club; the National Bank and the Commercial Bank in the same city; and the Bank of South Australia, Adelaide. His design was selected for the Parliament Houses, Adelaide, which are now being erected. He was a commissioner of the Melbourne International Exhibition, 1879-80; and in 1881 he was appointed hon. secretary for Victoria, of the Institute of British Architects, an office he held at the time of his death.

RANGOON.—The Government propose to build new Courts of Justice, and it is intended to ask architects to submit designs in competition. As far as can be learnt nothing, however, will be done for the next year or so.——The Strand Hotel, which was described in these columns more than a year ago, is now completed, and was recently opened. The building has cost about Rs. 3,50,000, without furniture or electric light and fans. Messrs. Swan & Maclaren, of Singapore, were the architects, the building operations being carried out by the owner, and the electric light, &c., by Messrs. Bagnall & Hilles, of Singapore and Yokohama.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The Lilleshall Company, Limited, have removed their offices from 12, Lime-street, to 71, Finsbury-pavement, Moorgate-street, E.C. Their new telephone number is "1,691 London Wall."

SCHOOL OF ART WOOD-CARVING.—The School of Art Wood-Carving, Imperial Institute, South Kensington, has been reopened after the usual summer vacation, and we are requested to state that some of the free studentships maintained by means of funds granted to the school by the Drapers' and the Clothworkers' Company are vacant. The evening class is for the present closed, but to meet the requirements of those professionally engaged during the week a special Saturday afternoon class is held. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

THE PLUMBERS' COMPANY.—At the quarterly meeting of the Court, held at the Guildhall on the 29th ult., Mr. Charles Hudson was sworn into the office of Master, and Mr. Alderman Richard Hind and Alderman Sir John Knill, Bart., into the offices of Warden and Renter Warden respectively for the year ensuing. Dr. F. J. Waldo, Medical Officer of Health for Temple and St. George's, Southwark, and Dr. Reginald Dudfield, Medical Officer of Health, Paddington, were admitted to the Freedom and Livery of the Company. A copy of a memorial to the Rt. Hon. A. J. Balfour was laid before the Court calling attention to the desirability of the Government dealing with the registration of qualified plumbers in the interest of the public health. It was reported that the following resolutions were passed at the Tenth International Congress of Hygiene and Demography held in Paris:—"1. That all plumbers' work, as much in the supply of drinking water as in the removal of soil or slop water, should be the object of particular attention. The pipes for the distribution of water, as well as the hydraulic apparatus (reservoirs, syphons, &c.), and the down pipes for slop water should be completely protected from frost. 2. That a professional education, with a test examination before obtaining a diploma, should be demanded of 'sanitary plumbers' with a view to spreading among plumbers a knowledge of hygiene and of rational and economic construction in their work."

HOUSING REFORM CONFERENCE IN NEWCASTLE.—A conference of local authorities, co-operators, trade unionists, and members of friendly societies was held in the meeting-room of the Co-operative Wholesale Society, West Blandford-street, Newcastle, on the 29th ult., for the purpose of considering the possibilities of practical action in regard to the urban and rural housing reform. In the absence of Mr. Thomas Burt, M.P., Mr. Davidson, of Bedlington, presided. The chairman stated that the meeting was of an altogether non-political character. Councillor Thompson (Richmond) moved the following resolution:—"That this Conference, recognising the terrible evils arising from bad housing conditions (*a*) urges Local Authorities in all districts where overcrowding and high rents prevail to vigorously use the powers they already possess, under the 'Housing of the Working Classes Act, 1890,' to borrow money for the purpose of acquiring land and erecting comfortable cottages and tenements thereon, and in this way not only securing an increased supply of suitable houses for the people, but also rendering possible the compulsory clearance of slum areas. (*b*) Whilst fully recognising the value of the work already performed by Co-operative Societies in supplying houses to their members, also urges societies in districts where housing conditions are below a right standard to earnestly consider the advisability of using capital in the erection of good houses, such houses to be let to members at the lowest possible rents, consistent with a fair return on the capital invested, and brought into effective competition with bad houses at high rents, thus enabling the Co-operative movement to accomplish, in this respect, a similar work to that which it has already performed in the provision of pure food at fair prices." This was seconded by Councillor John Johnson, and, after a long discussion, was carried unanimously. The following resolution was then moved by Councillor Millington and seconded by Mrs. Bell:—"That, in view of the fact that Local Authorities, co-operative societies, and other organisations desirous of supplying good houses for the working classes experience great difficulty in obtaining suitable land for building purposes, except at exorbitant and inflated values, this Conference is of opinion that Local Authorities should be empowered to compulsorily acquire (and hold) land, at a price based on its assessment to local and national taxation, such land to be either used under Part III. of the Act of 1890, or let with security of tenure, on terms which shall encourage the building of suitable cottages, and render impossible either the overcrowding of people in houses or the overcrowding of houses on land." After discussion, the resolution was passed. A resolution to the following effect was then passed:—"That this Conference, recognising that the relief of the pressure on housing accommodation in many industrial centres and the development of more healthy housing areas is largely dependent on the increase, quickening, and cheapening of the means of travel by tram and rail, urges—(*a*) The more thorough use of the powers already possessed by the Board of Trade (under the Cheap Trains Act, 1883) to secure the provision of an adequate supply of workmen's trains. (*b*) The rapid development of municipal electric trams and light railways. (*c*) The passing of legislation to secure a uniform system of cheap fares over areas surrounding large centres of population." After another resolution, to the effect that in the opinion of the Conference the period for repayment of loans for housing purposes should be extended to seventy years for buildings and one hundred years for land, and that a copy of the resolution be forwarded to the Local Government Board, had been carried, the proceedings concluded.

ODESSA TIMBER TRADE.—It appears from the annual report of the Committee of the Odessa Department of Trade and Manufactures that the export of timber, especially for building purposes, has considerably decreased, the quantity in 1899 being only 20,700 tons (exclusively of transit trade), whereas it amounted in 1898 to 36,500 tons. Boards are shipped to the United Kingdom, France, Egypt, Holland, and Belgium; beams and logs to the United Kingdom and France. There is a large transit trade in timber from Austria-Hungary through Russia to the Far East, France, and Holland for Germany. The figures given are 92,620 tons in 1899 and 110,774 tons in 1898.

EXPORTS OF GERMAN TIMBER.—Mr. Consul Hunt reports to the British Foreign Office that the timber exported from Dantzig in 1889 amounted to 308,000 tons, the largest quantity ever shipped from that port, as against 265,000 tons in 1898, an increase of 43,000 tons. The local sawmills were kept very busy, working both for shipment and the large requirements of the Dantzig building trade. The increased volume of trade all over the world in 1899 also favourably affected the Dantzig timber trade, although prices did not rise so rapidly as they did in 1898. Every description of pine and fir wood was in request at rising prices. Oak did not sell so well on account of its high price. There were either floated down the River Vistula, or reached Dantzig by railway in 1899, 717,160 cubic metres of wood, value 21,878,000 marks, as against, in 1898, 665,055 cubic metres, value 20,219,500 marks. The receipts for the year under notice, the largest ever reported, exceed those of the year preceding, also a record year, by about 8 per cent., both in quantity and value.—Mr. Vice-Consul Hay, reporting on the trade of Konigsberg, says that the principal kinds of timber exported from that port last year were:—Round timber, 26,500 tons; boards of all kinds, 87,000 tons; sleepers, 72,000 tons; mining timber and props, 21,000 tons. Of these 28,000 tons went to the United Kingdom, 4,800 tons to Belgium, 4,200 tons to Holland, and 1,500 tons to Denmark, the remaining 168,000 tons going to various parts of Germany.—From Memel Mr. Vice-Consul Pietsch reports that in 1899 business in wood took a favourable course. For some articles prices reached a height never known before, consequently the results were profitable in spite of the very high purchase prices paid by the shippers. The total value of the shipments of wood amounted to 960,720*l*. Business in fir timber and lathes has fallen off again. In the beginning of the year oak staves were unsaleable, and only 192*l*. 10*s*. to 195*l*. could be obtained per mille. Fir sleepers were sold during the year at rising prices. In sawn wood the stocks were large and the profit good. On the whole prices took an upward tendency. The export of red wood planks was small, but whitewood planks sold well. Whitewood deals also found ready buyers at remunerative prices. The export consisted of 76,800 loads, value 213,660*l*., as against 74,480 loads, value 193,335*l*., in 1898.

DRINKING FOUNTAIN, INVERURIE, N.B.—A drinking fountain and horse-trough combined has been erected at Inverurie as a memorial of the Diamond Jubilee. The work is of Rubislaw granite, with the exception of the basin, which is of Hill o' Fare granite. The memorial was designed by Councillor Boddie, Aberdeen.

APPOINTMENT.—The Department of Science and Art have appointed Mr. Robert Gibson, C.E. and architect, Dundee, to prepare plans and furnish reports regarding the structural arrangements and equipment of the principal technical schools and colleges throughout the country. Mr. Gibson, who has been selected for the work on account of his familiarity with the Department's requirements, is not required to give up any present appointment. The physical laboratory of Dundee High School and the textile room of the Technical Institute are included with the large London Polytechnics among the typical schools selected by the Department.—*Dundee Advertiser.*

DEMOLITION OF UNHEALTHY AREAS IN LEEDS.—The Leeds City Council have under consideration a scheme drawn up by the Sanitary Committee by which it is proposed to deal with a large lot of property as an insanitary area. The *Yorkshire Post* states that the lot comprises about 311,318 square yards, and, according to the estimate of Mr. T. Hewson, the City Engineer, the gross cost of the scheme will be 523,034*l*. Of this amount, however, it is calculated that over 225,000*l*. may be realised by the sale of surplus land, leaving the net cost of the whole scheme at 298,034*l*. Parliament is to be asked to sanction the proposal in accordance with the provisions of "the Housing of the Working Classes Act, 1890," the Medical Officer of Health having made the requisite official representation in reference to the area.

CAPITAL AND LABOUR.

LABOUR MARKET IN THE COLONIES.—The October circular of the Emigrants' Information Office states that in New South Wales, at the Broken Hill mines, there is a good demand for carpenters and masons, engine-drivers, firemen and cleaners, boilermakers, blacksmiths, toolsmiths, fitters, and a very good demand for good hard-ground miners. In Victoria there is a good demand, which is likely to continue, for a limited number of thoroughly skilled plumbers on the Melbourne drainage works, and for ironworkers. The Chief Inspector of Factories, in his annual report just issued, states that there was an increase of 3,702 persons employed in factories and workrooms in 1899 as compared with the numbers in 1898. In South Australia and Tasmania the supply of labour is mostly equal to the demand. In Western Australia the supply of men at Coolgardie in the building and other trades, of miners, and unskilled labourers is greater than the demand. At Northam there is a demand for all kinds of labour except miners. At Ferth the building and other trades have improved, but the supply is about equal to the demand. The last reports show that there was plenty of work in New Zealand. At Auckland and Napier the building trades have been busy; at Wellington the building and engineering trades; as also at Nelson. At Christchurch the building trades have been particularly busy, bricklayers having been in special demand; men in the engineering trades have also been fully employed. At Dunedin, carpenters, bricklayers, and stonemasons have been fully employed, but painters and plasterers have been slack. At Invercargill, the building trades—in which competent carpenters have been specially

wanted—and the engineering trades have been busy. Persons are warned against going to South Africa in search of work so long as the war lasts. They will not be allowed to proceed up country. There are large numbers of persons there at the present time who are out of employment.

LEGAL.

WHAT IS AN ADDITION?

At the Lambeth Police-court on Tuesday afternoon, Mr. J. T. Thompson, of Addington-square, Camberwell, was summoned by Mr. Ellis Marsland, District Surveyor for Camberwell, for beginning to execute work in respect of which he ought to have served a building notice before serving such notice. There was a second summons against the defendant for failing to comply with a notice of irregularity served upon him by the District Surveyor.

Mr. Marsland stated that on April 4 he found that an addition had been made to Mr. Thompson's premises without notice. The work was then practically completed. The addition consisted of a dressing-room opening out from a bedroom on the first floor. A doorway had been formed in the wall of the bedroom, and adjoining the dressing-room there was a bathroom.

Mr. Hopkins: Do you mean that a new room had been built?

Mr. Marsland: Yes, sir. At the side an enclosure had been formed with old sashes and matchboarding, and the roof was of wood and not covered with slates, tiles, or metal.

The defendant said Mr. Marsland had accepted a notice since.

Mr. Marsland said he had received something which Mr. Thompson called a notice. On June 13 he met Mr. Thompson after a good deal of correspondence, and pointed out the irregularities. The defendant promised to amend them. Afterwards Mr. Thompson resolutely refused to admit that this was an addition to the premises. The addition was not enclosed by walls, as directed by the Act.

The defendant gave an explanation of the matter, but at the close of his statement Mr. Hopkins said he must confess that he did not understand it. His worship added that he would visit the premises and see what had been done.

The case was then adjourned until the 23rd inst.

GREENHOUSE OR KITCHEN?

Mr. Hopkins, sitting at the Lambeth Police-court on Tuesday, heard a summons taken out by Mr. Ellis Marsland, District Surveyor for Camberwell, against Mr. Robert A. H. Baylis, of Crystal Palace-road, East Dulwich, for beginning to execute certain work without giving notice. There was a second summons against the defendant for failing to comply with a notice of irregularity. Mr. Marsland stated that on July 18 last he received from the defendant's firm—Messrs. Baylis & Francis—a post-card saying:—"Please take notice we are constructing a greenhouse in rear of 24, Barry-road, about 10 ft. square." On August 28 he went to the premises, and discovered that an addition had been made, consisting of a kitchen and scullery combined, but having the semblance of an attached conservatory.—Mr. Hopkins: How do you mean having a semblance?—Mr. Marsland produced a photograph of the structure, and said it had been built across the casement window of a living room, thereby depriving it of access to the air, as provided for in Section 70 of the London Building Act. The addition contained a slop sink, a gas cooking-stove, and various articles of kitchen furniture. The defendant was the builder. On August 28 he wrote to the defendant pointing out that he had received no notice of the work, and that what had been done was irregular. He met the defendant on the ground the next day, and pointed out how the irregularities could be remedied. He afterwards served the defendant with a notice of irregularity, but up to the present the work had not been amended, nor had the defendant given a proper notice of the work. He therefore asked for an order requiring the defendant to amend the irregularities.—The defendant said he claimed to have built what he was instructed to build—a conservatory. If his client chose to put a gas-stove and furniture there, he was not responsible for her action. He gave Mr. Marsland the notice which that gentleman had read. He did not think that it could be claimed that a conservatory was anything but a conservatory. It was built as such, as his contract and specification showed.—Mrs. C. K. Watkin, the owner of No. 24, Barry-road, said she asked the defendant if he could provide her with a place outside which she could use as a scullery, and in which she could place a gas-stove. She did not ask the defendant to build a conservatory, but he said it would have to be built as a conservatory because of the County Council requirements.—At the request of defendant, the witness produced the specification of the work.—The defendant gave evidence on his own behalf. He said he built the structure to the orders of Mrs. Watkin, who said she wished to have a conservatory placed between the back addition to the party wall of the premises and to lean against the back sitting-room. She said she wished to have a sink put in a corner and water laid on so that she could occasionally draw water from there without disturbing her lodger. He sent in a specification and showed her a rough sketch plan. The structure was completed on July 30. Until he heard from Mr. Marsland he did not know that the lady had a gas-stove in the place or that furniture had been placed in it.—Answering a question by the magistrate, Mr. Marsland said there could be no doubt that if the things now in it were cleared out, the place would be a conservatory.—Mr. Hopkins: The fact is that you object to the purpose for which it is being used.—Mr. Marsland said that was so.—Mr. Hopkins said he could not make any order upon the summons, which would be dismissed.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

11,092.—A Pendulum for Levels, &c.: *S. T. Tall and T. W. Box.*—Upon pivot screws within a rectangular casing swings a pendulum, whose end, shaped as an index, may be observed through the glass of a round-headed slot, and the angle of inclination is read off upon a scale on the edge of the slot. When the instrument is not being used a screw retains the pendulum against an india-rubber pad, and the instrument may be affixed to a rule by means of screw-holes formed in accurately-determined places in the case.

11,100.—Dredging by Siphonical Action: *F. D. Uzzunn.*—For dredging and draining operations a siphon is laid across a support with its one leg in the place to be drained and its other leg outside; the liquid flowing out of the siphon turns a motor, which works an agitator placed within the end of the siphon's longer leg by means of bands carried over pulleys at the bend of the siphon. The action of the siphon may be started with a pump placed in its end, or in any other suitable manner.

11,142.—Method of Moulding Bricks: *H. Alexander and F. Holding.*—A flat ring, which is fastened with counter-sunk screws, holds the mould lining plates or rectangular lining frames, which are supported with lugs within recesses in the table, and the lining is formed of soft iron or mild steel case-hardened in the centre so as to provide for an even wearing, or steel strips welded to an iron or soft steel backing may form a hard face; the frames or plates may also be packed in bone-dust or some carbonaceous material and sand, the receptacle being heated in a furnace, for graduating the hardness of the lining accordingly with the wear upon the different parts.

11,145.—An Apparatus for Closing and Opening Skylights: *S. Howard.*—The mechanism comprises a vertically sliding-rod and a cord that passes around pulleys mounted upon the rod and upon a fixed casing respectively. Upon the rod are threaded clutch plates or washers that will hold the opened skylight in any desired position and become fastened obliquely when the cord has been freed; to the casing is pivoted between the plates a releasing lever to which the cord's end is secured, the plates fitting between notches cut in the casing. When the cord has been freed the plates are forced into an inclined position by means of springs that are threaded upon the rod and press against them, to the skylight is attached an arm or bracket, having pivot or screw holes that will allow for adjustment, and joined with a link to the rod which is joined to the link with a hooked spring pin so that it may be easily detached by pressing the pin backwards; the rod is prevented from sliding through the casing by its collar.

11,167.—Fireproof Safes, &c.: *G. Niewiazowski.*—A fireproof material that will expand when it is heated is made for the greater part of water-glass, spirit varnish, and a binding cement composed of alumina, graphite, baryta, &c., fashioned in slabs joined by fusion, and filled into the safe, or employed as a plastic material to be laid between pasteboard and pressed together; around the composition, and between it and the outer walls, are inserted wood gratings or frames; it also is laid around the inner walls or wooden linings, and is covered with a thin wooden sheathing at the door-joints; if heated with fire the composition will fill the spaces between the woodwork, or the spaces that may remain when the woodwork is consumed; its expansion thereupon closes hermetically and protects the safe's inner lining or walls.

11,182.—Construction of Ceilings and Walls: *A. Rincklake.*—Underneath a sheet of woven jute which is fastened on to the joists or beams is stretched a network of hemp, string, or flax, and to the under surface of the jute is applied, through the interstices of the net, cement or gypsum plaster; in the case of walls the net is stretched vertically and on to both sides is applied a sheeting of jute which has been dipped in gypsum or cement; then one of the sides is plastered over and to the other side are fastened battens or fillets. Over the battens is stretched a second vertical net, a sheet of jute is next cemented to the net, and plaster is laid over the outside; the transmission of sound will be prevented by the jute sheeting, and between the battens are left air-spaces for isolation purposes.

11,208.—A Method of Glazing Roofs: *J. R. Scholefield.*—Water resulting from condensation is carried away by grooves that are formed in the astragals or glazing-bars, which take packing-cords composed of some flexible material, whilst caps of sheet-metal that are secured with screws to the bars and have grooves for packing-cord retain the glass sheets in their positions; the edges of the glass are pressed by the edges of the cap, whose elasticity will allow the glass to contract and expand.

11,210.—Construction of Tunnels: *T. H. Murphy.*—For the tunnel's outside lining are built up wooden segment-shaped blocks that will interlock together with some waterproof substance in the joints. Lagging or sheathing spiked on to blocks may be used to tie the rings together. The lining will act as an abutment for the rams of the shield, and as a protector for the concrete inner lining whilst it becomes set. For an anchorage for the inner lining projecting bolts and plates are employed.

11,237.—Brick Facing, Bevelling, Polishing, &c.: *W. Caplen & F. Caplen.*—The rubbing-stone is mounted upon bearings that are arranged beneath a table, the table's upper side is made of wood, and adjustable guides, to which clamping-screws are attached, are placed thereupon.

11,270.—Metallic Bricks: *A. Grayson & W. J. Spratly.*—Tapered walls and partitions are fashioned in the metal bricks which are after the kind specified in No. 16,027 of 1897, and their dove-tailed recesses, which take wooden plugs, have wedge-shaped ribs or tapered blades that will cause the plugs to expand when they are forced downwards.

11,297.—Roofing Tiles and Plates: *F. J. Börner.*—The tile's lower edge is turned over in order that it shall engage with the correspondingly folded edge of the tile next below it, which is hung and fastened with an angular and hooked strip rectangular in shape. The strip is affixed to the framework of the wall or roof, and interlocked in the upper hooked edge of a three-sided tile. Between the tile's interlocking edges are wedged strips and keys, which are folded over, the lower folded edges being cut away so as to take the keys.

11,302.—Removal of Pitch from Paving-blocks, Stones, &c.: *R. Whitfield.*—By one form of the invention whereby the blocks are heated by a furnace which has a vessel to hold the melted pitch, the products of combustion are caused to pass from the fire-box through the flues and a space around the receiving chamber, the blocks being carried upon an endless chain which circulates through the central upper flue, and is moved with hand-power. Escape of hot gases is prevented by means of flaps which a set of brackets raise in turn. The apparatus is described as being adapted for use as an ordinary cauldron for heating pitch.

11,333.—Treatment of Wood: *H. V. Simpson.*—For rendering wood non-inflammable, waterproof, and non-corrosive, it is subjected to repeated immersions in a solution of salts that is forced into a receiver under pressures varying from 250 to 300 lbs. per square inch. After an ebullition of the solution in the wood has been effected by the admission of live steam, the solution is drawn off before exhaustion of the receiver; the salts should consist of phosphate of ammonia, sulphates of ammonia, and sulphates of zinc or magnesia, and can be mixed with colouring matter, or the colouring matter (without the salts) can be forced into the wood by the process described.

11,339.—Shelving for Shops, &c.: *V. Holstrom.*—Recesses and strips at intervals are provided as supports for the standards at front and back, the extended horizontal flanges of other L-shaped supports are notched for engagement with the edges of the strips, and one recess is cut more deeply than is the other so that the supports can be readily inserted into their places, the flanges support the shelves, and the supports, being held in position by the shelves, tie the standards together. In another form of construction the supports have a T section, the horizontal flanges being turned over or notched for engagement with the strips.

11,372.—A Window-sash Fastener: *J. Hudswell.*—At the side or the middle of the top rail of the lower sash is a hinged plate whereof a portion is attached to the rail, the other portion is movable and can be thrown over the upper sash's bottom rail, through a lug upon the plate's fixed part and through a screwed lug upon its other part a thumb-screw passes into a plain eyelet upon the upper sash's bottom rail so as to keep the window closed; when the screw is liberated from the eyelet one can raise the lower sash until a projection upon the sash stile or upon the middle dividing bar stops the movable part of the hinged plate, and the window can be quite opened by a withdrawal of the screw in order that the movable part shall be turned so as to clear the stop.

11,425.—Paperhangings, Wall Coverings, &c.: *H. Bremer.*—A backing or underlayer for paper-hangings, wall coverings, linoleum, mattings, and so on, is made by finely dividing cork chips, waste cork, &c., and mixing the product with some binding agent, for instance, lactein, casein, or an india-rubber, a resinous, or other preparation. The inventor claims for the backing certain moisture-proof, sound-proof, and draught-proof qualities, and that it will constitute a bad conductor of heat.

11,431.—An Appliance for Use with Street Lamps: *G. Livesey.*—The inventor's object is to minimise the shadows which are cast by the framed

lanterns of incandescent lamps; he has devised a lantern with a circular cross-section which he mounts upon three supports that are placed at unequal distances from one another, the distances being so arranged in relation to the pavement and the kerb that they shall present a clear front to the road and cause the shadows to be cast as far as possible from the road.

11,490.—Manufacture of Earthenware Pipes: *W. Möbius.*—In the process of moulding several pipes are formed inside one another at one and the same time; the innermost pipe is moulded between a bell and a rounded knife, two outer pipes are simultaneously moulded round about the casings of the inside pipe and the next adjacent pipe, which serve as cores; the pipes will leave the press together and the moulding process will continue whilst they are being cut into lengths at a single stroke of the cutter.

11,536.—An Artificial Paving-Stone: *F. H. McLean.*—A thick slurry, to be moulded into bricks or slabs, is made of an admixture of Portland cement, water, and pulverised burned clay or ballast; the moulding apparatus comprises the well of a hydraulic press, whose cover is raised and lowered with an auxiliary press; the cover is supported by columns in which are slots, through which pass sliding bars that hold the closed cover down, the cover's under surface being grooved that water may escape from the press; when the slurry has been put into the mould a sheet of woven fabric and a sheet of felt are laid over it; a ram for removal of the finished block, a travelling hopper upon rails, a mixing platform, and a tipping measuring contrivance are also included in the machine.

11,577.—Construction of Roofs: *E. L. Pease.*—The tie-rods and struts are so arranged on the outside that they shall keep the head-way or span clear within, a split tubular rafter secures a strut, and a tie-rod is fastened on to a lug of a T-shaped bar, which is attached with bolts to a split tubular standard—that form of the invention will serve for truncated roofs, as well as roofs whose rafters are extended so as to meet at the ridge; in another form the horizontal tubular members will extend over the rafters to which they are joined with links or struts, or for curved roofs (tie-rods being discarded), split bow- or arch-shaped tubes compose the principals, the flanged edges of the curved roofing-plates being placed in the tubular rafters and being locked with transverse stretchers or struts.

MEETINGS.

Friday, October 5.

The Architectural Association.—Annual General Meeting. Address by the President, Mr. W. Howard Seth-Smith, and distribution of prizes. 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector, Outdoor." 8 p.m.

Civil and Mechanical Engineers' Society.—President's address by Prof. R. H. Smith. 8 p.m.

Saturday, October 6.

British Institute of Certified Carpenters.—Meeting at Carpenters' Hall. 6 p.m.

Northern Architectural Association.—Visit to Co-operative Societies' Building, Blandford-street, Newcastle.

Monday, October 8

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector, Indoor." 8 p.m.

Liverpool Architectural Society.—Ordinary meeting. Opening address by the President, Professor F. M. Simpson. 6 p.m.

Tuesday, October 9.

Architectural Association.—Preliminary meeting of the School of Design. Addresses by Messrs. Aston Webb, A.R.A., and Beresford Pite. 7 p.m.

Wednesday, October 10.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley, B.A., on "Duties of a Sanitary Inspector, Offensive Trades and Trade Nuisances, &c." 8 p.m.

Thursday, October 11.

Carpenters' Hall, London Wall (Lectures on Sanitary Building Construction).—Mr. A. Wynter Blyth on "Sanitary Appliances." 7.30 p.m.

Friday, October 12.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. H. R. Kenwood, on "Infectious Diseases." 8 p.m.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

September 4.—By W. S. Miller & Co. (at Brecon).

Cwmwyag, Brecon.—Blaenau and Pentrebach Farms, 811 a. 1 r. 30 p., f. £5,000
Moiety of Brynmaendu Farm, 36 a. 3 r. 39 p., f. 150

September 24.—By Higgins & Son.

St. John's Wood.—14 and 15, Henstridge-place, u.t. 34 yrs., g.r. 10*l.*, r. 76*l.* 680
15, Elm Tree-rd., u.t. 17 yrs., g.r. nil, r. 100*l.* 810
26, Abercorn-pl., u.t. 49 yrs., g.r. 9*l.*, r. 75*l.* .. 690
32 and 33, Acacia-rd., f., e.r. 110*l.* 1,825
Regent's Park.—17, Culworth-st., u.t. 27 yrs., g.r. 8*l.*, e.r. 45*l.* 370

By Messrs. Rutter.

Wethersfield, Essex.—The Waver Farm, 107 a. 1 r. 38 p., f. 1,275
New Barns Farm, 133 a. 3 r. 32 p., f. 1,300
Wright's Farm, 142 a. 0 r. 34 p., f. 1,225
Wetheringsett, Suffolk.—The Green Farm, 133 a. 0 r. 20 p., f. and c. £1,000

September 25.—By David Burnett & Co.

Finsbury Park.—315, Seven Sisters-rd., u.t. 64 yrs., g.r. 15*l.* 15*s.*, r. 65*l.* 550
Fulham.—88, Harwood-rd., u.t. 87 yrs., g.r. 7*l.* 8*s.*, r. 38*l.* 400

By Harman Bros.

Norwood.—Harrington-rd., f.g.r. 14*l.*, reversion in 82 yrs. 330
Love-lane, f.g.r.'s 21*l.*, reversion in 82 yrs. 500

By Ogden, Sons, & Olley.

Wimbledon.—45, High-st., f., r. 45*l.* 1,220

By Rutley, Son, & Vine.

Wembley, Middlesex.—Station-grove, Isca, f., r. 26*l.* 315
5, Grove Villas, u.t. 58 yrs., g.r. 4*l.* 10*s.* 200

By Frederick Warman.

Holloway.—28, Hornsey-st., u.t. 58 yrs., g.r. 6*l.* 10*s.*, r. 36*l.* 365

By Wriford & Dixons.

Corringham, Essex.—Brick House Farm, 80 a. 0 r. 17 p., f. 1,550
The Tilbury Brickfields, 18 a. 1 r. 12 p., f. 1,250
Enclosures of land, 36 a. 2 r. 18 p., f. 260

By Schofield, Evans, & Co. (at Masons' Hall Tavern).

Romford, Essex.—High-st., the Golden Lion Hotel, f., with goodwill 23,000

September 26.—By Frank Jolly & Co.

Bethnal Green.—59 and 61, Grove-rd., u.t. 68 yrs., g.r. 15*l.*, r. 85*l.* 930

By R. Tidey & Son.

De Beauvoir Town.—36, Southgate-rd., u.t. 18½ yrs., g.r. 8*s.*, r. 40*l.* 300

By Wagstaff & Sons.

Barnsbury.—2, Arundel-place, f., e.r. 60*l.* 850

By Messrs. Spelman (at Norwich).

Norwich.—27 and 28, Tombland, f., r. 160*l.* 3,400

By Morris & Place (at Nottingham).

Elton, Notts.—The Elton Manor Estate, 1,075 a. 2 r. 39 p., f. 27,000

By Dickinson & Riggall (at Louth).

North Somercoates, &c., Lincs.—A freehold estate, area 611 a. 1 r. 31 p. 18,300

By Willson & Phillips (at Southend).

Southend-on-Sea, Essex.—Salisbury-avenue, 15 plots of building land, f. 1,150

By Balch & Balch (at Camden Town).

Kentish Town.—90, Healey-st., u.t. 57 yrs., g.r. 7*l.*, r. 40*l.* 445
Holloway.—68, Bickerton-rd., u.t. 76 yrs., g.r. 6*l.* 10*s.*, r. 42*l.* 355

September 27.—By Curtis & Henson.

Islington.—13, White Horse Yard, c., r. 30*l.* 290

By J. G. Dean & Co.

Clapham.—132, Salcott-rd., u.t. 81½ yrs., g.r. 6*l.* 10*s.*, e.r. 36*l.* 350
Wandsworth.—7, Bennerley-rd., f., e.r. 30*l.* 435

By C. C. & T. Moore.

Mile End.—15, Hunt-st., area 1,360 ft., f. 1,000
155, Devonshire-st., and 144, Globe-rd., u.t. 12½ yrs., g.r. 6*l.* 10*s.* 260
Finsbury Park.—238, Woodstock-rd., u.t. 66½ yrs., g.r. 7*l.*, e.r. 45*l.* 425

By J. A. & W. Tharp.

Bromley-by-Bow.—3 and 5, Box-st., u.t. 63 yrs., g.r. 5*l.* 145
Bow.—16 to 32 (even), Coborn-rd., u.t. 16½ yrs., g.r. 36*l.* 1,440
Hackney.—32, 34, and 36, Morning-lane, c., r. 115*l.* 1,630
Penge.—63 to 73 (odd), Maple-rd., f. 1,520

By Stimson & Sons.

Yiewsley, Middx.—Trout-lane, Yiewsley Lodge and 1½ acre, f. 1,500
Trout-lane, enclosure of land, 2 a. 2 r. 29 p., f. 500
Trout-lane, six freehold houses and five cottages 1,450
High-street, The Laurels, f., r. 26*l.* 360
Hillingdon, Middx.—The Greenway, Cleveland House, u.t. 54 yrs., g.r. 6*l.* 10*s.*, r. 47*l.* 5*s.* .. 500
Villier-st., the Load of Hay p.-h., u.t. 54 yrs., g.r. 5*l.*, r. 35*l.* 690
2 and 2, Villier-st., u.t. 54 yrs., g.r. 2*l.* 260
Kensington.—8, Hyde Park-gate, u.t. 43½ yrs., g.r. 25*l.*, r. 260*l.* 4,000
Brompton.—34, Brompton-sq., u.t. 15 yrs., g.r. 15*l.*, r. 140*l.* 1,070
1, Rutland-st., f., r. 3*l.* 670
Hampstead-rd.—No. 249, u.t. 8 yrs., g.r. 9*l.* 10*s.*, r. 65*l.* 235
Blackfriars.—89, Stamford-st., u.t. 9 yrs., g.r. 20*l.*, e.r. 18*l.* 200
New Cross.—92, Woodpecker-rd., u.t. 58 yrs., g.r. 6*l.*, r. 36*l.* 335
Islington.—259, Essex-rd., u.t. 45 yrs., g.r. 6*l.* 6*s.*, e.r. 55*l.* 545
31, Clarence-st., u.t. 36 yrs., g.r. 6*l.*, r. 40*l.* 390

By Walter Hall.

Caledonian-rd.—4, Bryan-pl., u.t. 43 yrs., g.r. 5*l.* 315
18, Bryan-st., u.t. 43 yrs., g.r. 5*l.* 315
St. Pancras.—10 and 11, Burton-st., u.t. 6 yrs., g.r. 18*l.* 18*s.* 145
54 and 55, Drummond-cres., u.t. 18 yrs., g.r. 10*l.* 315
King's Cross.—55 and 57, Winchester-st., u.t. 33 yrs., g.r. 24*l.* 570
Camden Town.—5 and 13, Camden-st., u.t. 10 yrs., g.r. 60*l.* 540
30, Eversholt-st., u.t. 42½ yrs., g.r. 4*l.*, r. 72*l.* .. 810

By Grimley & Son (at Birmingham).

Ribbesford, Worcester.—The Ribbesford Estate, 1,541 a. 1 r. 23 p., f. 23,000

September 28.—By C. Rawley Cross & Co.

Paddington.—1 to 13 and 14, Blomfield-mews, u.t. 42 yrs., g.r. 30*l.* 8*s.*, r. 106*l.* 500
Shepherd's Bush.—75, 77, and 79, Bolingbroke-rd., u.t. 94 yrs., g.r. 19*l.* 10*s.* 830

By C. W. Davies & Son.

Kentish Town.—110 and 119, Carlton-rd., u.t. 50 yrs., g.r. 12*l.*, r. 72*l.* 745
Highbury.—49, Ronalds-rd., u.t. 85 yrs., g.r. 7*l.* 18*s.* 8*d.*, r. 48*l.* 415

By F. Miller & Reid.

Barnes.—38, Barnes-ter., f., r. 30*l.* 600

By J. R. Thornton.

Penge.—5 to 11, Pembroke-ter., u.t. 86 yrs., g.r. 35*l.*, r. 225*l.* 2,100

By A. J. Sheffield.

St. George's East.—17 and 17a, Old Gravel-lane, with warehouses, &c., in rear, u.t. 73 yrs., g.r. 60*l.*, e.r. 320*l.* 12*s.* 1,000
East Ham.—1 to 11 (odd), Brighton-rd., f., (including equity) £1,050
37 to 57 (odd), Brighton-rd., f., (including equity) 1,790
Plaistow.—2, 4, 6, and 8, Victoria-pl., u.t. 53 yrs., g.r. 12*l.* 425

Contractions used in these lists.—F.g.r. for freehold ground-rent; L.g.r. for leasehold ground-rent; I.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	15	0	per 1,000	alongside, in river.	
Rough Stocks and Grizzles	1	11	0	,,	,,	,,
Smooth Bright Facing Stocks..	1	18	0	,,	,,	,,
Shippers	2	2	0	,,	,,	,,
Flettons.....	1	9	6	,,	,,	,,
Red Wire Cuts ..	1	15	0	,,	at railway depôt.	
Best Fareham Red	3	11	6	,,	,,	,,
Best Blue Pressed Staffordshire ..	4	7	0	,,	,,	,,
Do., Bullnose	4	12	0	,,	,,	,,
Best Stourbridge Fire Bricks	4	4	6	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers.....	13	0	0	,,	,,	,,
Headers	14	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	17	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers..	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,
Two Sides and one End	20	0	0	,,	,,	,,
Splays, Chamfered, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers..	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamfered, Squints	14	0	0	,,	,,	,,
Seconds Quality White and Dipped Salt Glazed	7	0	0	,,	less than best.	

	s.	d.		
Thames and Pit Sand	3	0	per yard, delivered.	
Thames Ballast	6	9	,,	,,
Best Portland Cement	37	6	per ton	,,
Best Ground Blue Lias Lime..	24	0	,,	,,

Note.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

STONE.

		s.	d.			
Ancaster in blocks		2	0	per ft. cube, deld. rly. depôt		
Bath	,, ...	1	7	,,	,,	
Boer	,, ...	1	6½	,,	,,	
Grinshill	,, ...	1	10	,,	,,	
Brown Portland in blocks		2	2	,,	,,	
Darley Dale	,,	2	1½	,,	,,	
Red Corsehill	,,	2	5	,,	,,	
Red Mansfield	,,	2	4½	,,	,,	
Hard York	,,	2	10	,,	,,	
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)		2	7	per ft. super. at rly. depôt.		
,, ,, 6 in. Rubbed Ditto..		2	10½	,,	,,	
,, ,, 3 in. sawn both sides slabs (random sizes)		1	3	,,	,,	
,, ,, 3 in. self-faced Ditto		0	9	,,	,,	

SLATES.

in.	in.	£	s.	d.		
20×10 best blue Bangor...		11	5	0	per 1000 of 1200 at rly. dep.	
,, best seconds	,,	10	15	0	,,	,,
16×8 best	,,	6	2	6	,,	,,
20×10 best blue Portmadoc		10	18	0	,,	,,
16×8 best blue Portmadoc		6	0	0	,,	,,
20×10 best Eureka unfading green...		11	2	6	,,	,,
16×8 ,,	,,	6	15	0	,,	,,
20×10 Permanent green and Sedan green		10	0	0	,,	,,
16×8 ,,	,,	5	12	6	,,	,,

TILES.

	s.	d.		
Best plain red roofing tiles..	41	6	per 1,000 at rly. depôt.	
Hip and valley tiles....	3	7	per doz.	,,
Best Broseley tiles	42	6	per 1,000	,,
Hip and valley tiles....	4	0	per doz.	,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000	,,
Do. ornamental Do.	60	0	,,	,,
Hip tiles.....	4	0	per doz.	,,
Valley tiles.....	3	9	,,	,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50	9	per 1,000	,,
Hip tiles	4	1	per doz.	,,
Valley tiles.....	3	8	,,	,,

[See also page 301.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Plans and Sections for Laying-out Pleasure Grounds	Old Swindon U.D.C.	50l.	Oct. 22

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Additions to Gasworks, Hollinwood	Oldham Corporation	A. Andrews, Greaves-street, Oldham	Oct. 9
Landing Stage, Northam	Southampton Corporation	W. B. G. Bennett, Engineer, Municipal Offices	do.
Register House, Edinburgh	Office of Works	Secretary, H.M. Office of Works, Storey's Gate, S.W.	do.
Building Works, Greenhill	Harrow U.D.C.	R. Thornton, Council Offices, Harrow	do.
House, Wharfedale	.....	H. & E. Marten, Architects, 7, Charles-street, Bradford	do.
House, Stables, &c., West-street, Bridlington	Mr. W. Webster	J. Earnshaw, Architect, Bridlington	do.
Post Office, Clonmel, Ireland	.....	H. Williams, Office of Public Works, Dublin	do.
Additions to Leece Croft Mills, Kendal	Messrs. Barron & Hoggarth	S. Shaw, Architect, Kendal	Oct. 10
Street Works, Moorland-road and Wharf-road	Hemel Hempstead Corporation	W. R. Locke, Borough Surveyor, Town Hall	do.
Lavatory Building, &c., Stockport-road	Levenshulme U.D.C.	J. Jepson, Surveyor, Tiviot Dale, Stockport	do.
Public Offices, City Chambers	Edinburgh Corporation	R. Morham, City Chambers, Edinburgh	do.
Sewers, &c., Fatfield	Chester-le-Street R.D.C.	J. H. Mole, Surveyor, Chester-le-Street	do.
House, Duke-street, Londonderry	Mr. P. Doherty	D. Conroy, Architect, 2, Bishop-street, Londonderry	do.
Additions to Workhouse	St. Albans Guardians	H. B. Hansell, Architect, St. Albans	do.
Park Lodge	Hoylake & West Kirby U.D.C.	T. Foster, Surveyor, Council Offices, Hoylake	do.
Water Supply Works, Washington, co. Durham	Chester-le-Street R.D.C.	J. H. Mole, Surveyor, Chester-le-Street	do.
Railway Siding (1,100 yards), near Morpeth	Netherton Colliery Owners	Manager, Netherton Colliery, near Morpeth	Oct. 11
Additions to Schools, Rowland's Gill	Winlaton School Board	Liddle & Brown, Architects, Mosley-street, Newcastle-on-Tyne	do.
Sewers, &c., St. Ann's Well-road	Nottingham Corporation	A. Brown, Civil Engineer, Guildhall, Nottingham	do.
*Workmen's Dwellings	Twickenham U.D.C.	Surveyor, Council Town Hall, Twickenham	do.
*Cottages, Parker-road, Grays	Gray's Thurrock U.D.C.	Surveyor, Council Offices, Grays	do.
Sewerage Works, &c., St. Helens, Cumberland	.....	J. S. Moffatt, Architect, 53, Church-street, Whitehaven	Oct. 12
Two Houses and Three Shops, Great Yarmouth	Mr. H. R. Atkins	C. G. Baker, Architect, Town Hall Chambers, Great Yarmouth	do.
Stores, Water-street, Lancaster	Mr. J. Whittaker	J. Parkinson, Architect, 67, Church-street, Lancaster	do.
Two Houses, Warwick-road, Carlisle	.....	H. H. Hodgkinson, Architect, Carlisle	do.
Water Supply Works, Balmore and Torrance	Stirlingshire County Council	Kyle & Frew, Engineers, 140, West George-street, Glasgow	do.
*Repairs, &c., to Winter Garden	Cheltenham Corporation	Borough Surveyor, Municipal Offices, Cheltenham	Oct. 13
Shop and Premises, Ebrington-street, Plymouth	.....	F. A. Clark, Architect, New Town Chambers, Plymouth	do.
Widening Bridge, Tirphil	Bedwellty U.D.C.	J. H. Lewis, Civil Engineer, Blackwood, Mon.	do.
Sanitary Annex	Ashby-de-la-Zouch Guardians	Everard & Pick, Architects, 6, Millstone-lane, Leicester	do.
Greenhouse, &c., Jubilee Park	Middleton (Lancs.) Corporation	F. Entwistle, Town Hall, Middleton	do.
Shop and House, Limavady-road, Londonderry	Mr. S. Elder	J. G. Ferguson & Son, Architects, 20, Pump-street, Londonderry	do.
Public Library, Dumfries, N.B.	.....	John Grierson, 57, Buccleuch-street, Dumfries	Oct. 15
Alterations to Police Court	Halesowen R.D.C.	W. Whitworth, Surveyor, Halesowen	do.
Footbridge, &c., Kebroyd	Barkisland U.D.C.	Surveyor, Council's Offices	do.
Six Houses, Pontefract	.....	W. Hurst, Architect, Pontefract	do.
Granite (1,000 tons)	Guildford Town Council	C. G. Mason, Civil Engineer, Tuns Gate, Guildford	do.
Mortuary, Livingstone-street	Birkenhead Corporation	C. Brownridge, Civil Engineer, Town Hall, Birkenhead	do.
*Making-up Roads	Beckenham U.D.C.	Surveyor, Council Offices, Beckenham, Kent	do.
*Making-up Bromley Gardens	Beckenham and Bromley U.D.C.	do.	do.
*Sewerage Works	Acton District Council	Surveyor, Council Offices, 242, High-street, Acton	Oct. 16
Concreting at Baths, New Islington	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
Additions to Workhouse, West End-lane	Barnet Guardians	W. H. Mansbridge, Architect, 40, High-street, Barnet	do.
Schools, East Hyde	Luton School Board	J. R. Brown & Son, Castle-street, Luton	do.
Reservoir, &c., near Wellingborough	Wilby Parish Council	G. F. Bearn, Surveyor, Market-square, Wellingborough	do.
*Chimney Shaft, &c.	Whitechapel Board of Works	M. W. Jameson, Engineer, 15, Great Alie-street, Whitechapel	do.
*Kerbing, Tarpaving, &c. Oakford Avenue, Sydenham	Lewisham Board of Works	Surveyor, Town Hall, Catford, S.E.	do.
*Kerbing, Tarpaving, &c. Whitburn-road, Lewisham	do.	do.	do.
*Making-up Mayfield Avenue	Chiswick U.D.C.	Surveyor, Council Offices, Sutton Ct., Sutton Court-rd., Chiswick	Oct. 17
Road Diversion, Alltwen	Glamorgan County Council	T. M. Franklen, County Offices, Cardiff	do.
Sewerage Works, Alperton	Wembley U.D.C.	W. Bagshaw, Public Offices, Wembley	do.
Waterworks (18 miles)	Axbridge (Somerset) R.D.C.	A. Powell, Civil Engineer, 3, Unity-street, Bristol	Oct. 18
*Materials	Great Western Railway	Stores Superintendent, Great Western Railway Office, Swindon	Oct. 22
Widening Railway, Dunrod to Wemyss Bay	Caledonian Railway Company	J. Blackburn, 302, Buchanan-street, Glasgow	do.
Steel Rails (3,000 tons)	Glasgow Corporation	J. Young, 88, Renfield-street, Glasgow	Oct. 23
Stabling, &c., Staveley	Derbyshire County Council	J. S. Storey, County Surveyor, St. Mary's Gate, Derby	Oct. 24
*Two Shops in South End, Croydon	.....	F. & W. Stocker, Architect, Queen-street, Cheapside, E.C.	do.
*Hospital	Fylde, Preston, &c. Jt. Hos. Com.	See Advertisement	Oct. 26
Drainage Works, Aughnacloy, Ireland	.....	G. P. Halton, Civil Engineer, Church-street, Dungannon	Oct. 27
*Making-up Roads	Windsor R.D.C.	See Advertisement	Oct. 29
*Sewering, Levelling, Paving, &c.	Hornsey U.D.C.	Engineer, Council Office, Southwood-lane, Highgate, N.	do.
Schools, Moughley Lisnaskea, Ireland	.....	B. L. Winslow, Lisnaskea	Nov. 1
Harbour Works, Dundrum Bay	Down County Council	County Surveyor, Court House, Downpatrick, co. Down	do.
Six Cottages, Pool Bank Quarries, near Leeds	.....	B. Whittaker & Sons, Ltd., Horsforth, near Leeds	No date
Extension of Brook-street, Ilkley	.....	Empsall & Clarkson, Architects, 7, Exchange, Bradford	do.
Road Works, Ilkley-in-Wharfdale	.....	do.	do.
Repairs, &c., to Cottages, New-road, Barnet	.....	H. Harwood, 71, New-road, Barnet	do.

PUBLIC APPOINTMENTS

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Clerk of Works	Cardiff Corporation	250l. per annum	Oct. 17
*Clerk of Works	Beckenham U.D.C.	2l. 2s. per week	Oct. 18
*Deputy Borough Engineer	Salford Corporation	250l. per annum	Oct. 25

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. iv. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xix. & xxi.*

PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	16 10 0	18 0 0
Deals: best 3 by 9	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	12 10 0	13 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	,, ,, ,,
	At per load of 50 ft.	
Fir timber: Best middling Dantzig or Memel (average specification)	4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (35 ft. average)	4 0 0	4 10 0

JOINERS' WOOD.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	27 10 0	28 10 0
3 in. by 9 in.	24 0 0	25 0 0
Battens, 2½ in. and 3 in. by 7 in.	20 0 0	21 0 0
Second yellow deals, 3 in. by 11 in.	22 10 0	24 0 0
,, ,, 3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	16 10 0	18 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
Do. 3 in. by 9 in.	22 0 0	23 0 0
Battens	16 10 0	17 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	14 0 0	14 10 0
Third yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	14 10 0
Battens	12 10 0	13 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 10 0	16 10 0
,, ,, ,, 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 10 0	13 10 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	11 0 0	12 0 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—		
Planks, per ft. cube	0 3 6	0 4 6
Dantzig and Stettin Oak Logs—		
Large, per ft. cub:	0 2 6	0 2 8
Small ,, ,,	0 2 4	0 2 7
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
½ in. do. do.	0 0 7	- - -
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 2 3	0 3 0

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	9 7 6	- - -
Compound Girders ,, ,,	13 10 0	- - -
Angles, Tees and Channels, ordinary sections	12 10 0	14 10 0
Flitch Plates	12 0 0	- - -

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	10 0 0	10 12 0
Staffordshire Crown Bars, good merchant quality	11 5 0	11 15 0
Staffordshire "Marked Bars" ..	13 5 0	- - -
Hoop Iron, basis price	11 5 0	11 15 0
,, ,, galvanised	17 0 0*	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	11 10 0	- - -
,, ,, to 24 g.	12 15 0	- - -
,, ,, to 26 g.	13 15 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 15 0	- - -
,, ,, 22 g. and 24 g.	15 5 0	- - -
,, ,, 26 g.	16 15 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	18 10 0	- - -
,, ,, 22 g. and 24 g.	19 0 0	- - -
,, ,, 26 g.	20 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	14 0 0	14 15 0
,, ,, 20 g. and 24 g.	14 15 0	15 10 0
Cut nails, 3 in. to 6 in.	11 10 0	- - -
(Under 3 in. usual trade extras.)		
LEAD—Sheet, English, 3 lbs. & up.	20 0 0	- - -
Pipe in coils	20 10 0	- - -
ZINC—Sheet—		
Vieille Montagne ton	28 0 0	- - -
Silesian	27 10 0	- - -

PRICES CURRENT (*Continued*).

	£ s. d.	£ s. d.
COPPER—		
Strong Sheet per lb.	0 1 1	- - -
Thin ,,	0 1 3	- - -
Copper nails ,,	0 1 3	- - -
BRASS—		
Strong Sheet ,,	0 0 11	- - -
Thin ,,	0 1 1	- - -
TIN—English Ingots ,,	0 1 7	- - -
SOLDER—Plumbers' ,,	0 0 8	- - -
Tinmen's ,,	0 0 10	- - -
Blowpipe ,,	0 1 0	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
,, fourths	2¾d. ,, ,,
21 oz. thirds	3½d. ,, ,,
,, ,, fourths	3¾d. ,, ,,
26 oz. thirds	4½d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5½d. ,, ,,
,, ,, fourths	5d. ,, ,,
Fluted sheet, 15 oz.	3½d. ,, ,,
,, ,, 21 ,,	4½d. ,, ,,
⅛ Hartley's Rolled Plate	3d. ,, ,,
⅜ ,, ,, ,,	3½d. ,, ,,
½ ,, ,, ,,	4d. ,, ,,

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 3 1
,, ,, ,, in barrels ,,	0 3 2
,, ,, ,, in drums ,,	0 3 4
Boiled ,, ,, in pipes ,,	0 3 4
,, ,, ,, in barrels ,,	0 3 5
,, ,, ,, in drums ,,	0 3 7
Turpentine, in barrels ,,	0 2 5
,, in drums ,,	0 2 7
Genuine Ground English White Lead ..per ton	27 10 0
Red Lead, Dry ,,	25 0 0
Best Linseed Oil Putty per cwt.	0 9 6
Stockholm Tar per barrel	1 7 0

VARNISHES, &c.

	per gallon. £ s. d.
Fine Elastic Copal Varnish or outside work ..	0 16 6
Best Elastic Copal Varnish for outside work ..	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDEEN.—Accepted for additions to Ferryhill Public Schools, for the School Board. Mr. J. A. O. Allen, architect, 22, Union-terrace, Aberdeen:—

Masonry.—G. Hall ..... }
Carpentry.—Clark & Donaldson .. }
Slating.—A. Martin ..... } £1,674 12 11
Plastering.—Sellar & Co. ..... }
Plumbing.—A. Fiddes ..... }
Painting and Glazing.—B. Main .. }

[All of Aberdeen.]

BROMLEY (Kent).—For sewering, paving, &c., Scott's-road, for the Urban District Council:—

H. Struter	£580 0	R. Stockwell	£407 6 8
George Wilson	563 13	A. C. Soan, Streatham*	389 2 7
Mowlem & Co.	421 0		
Lawrence & Thacker	414 18		

BURTON-ON-TRENT.—For the erection of shop premises, Balfour-street, for the Burton-on-Trent Artisans' Dwellings Company, Limited. Mr. Thomas Jenkins, architect, 35, High-street, Burton-on-Trent:—

No. 4 Contract.

H. Edwards* £745

BURTON-ON-TRENT.—For the erection of premises, High-street, for the Young Men's Christian Association. Mr. Thomas Jenkins, architect, 35, High-street, Burton-on-Trent. Quantities by the architect:—

J. T. Varlow	£4,753 13 2	G. Hodges	£3,830 0 0
H. Edwards	4,275 0 0	R. Kershaw*	3,775 0 0
Lowe & Sons	3,963 0 0		

BURTON-ON-TRENT.—For additions to the White Hart Hotel, High-street, for Messrs. Ratcliff, Gretton, Limited. Mr. Thomas Jenkins, architect, 35, High-street, Burton-on-Trent. Quantities by the architect:—

J. Hunter, Limited	£950	G. Hodges	£820
Lowe & Sons	826	H. Edwards*	788

CHAPEL ALLERTON (Leeds).—Accepted for the erection of a home for children, with house, office, &c., for the Leeds Union Guardians. Mr. Percy Robinson, architect, Albion-street, Leeds. Quantities by the architect:—

Bricklaying and Masonry.—J. T. Wright	£3,250 0 0
Joinery and Carpentry.—Ledgard & Sons	1,640 0 0
Plumbing and Glazing.—J. Linley	699 0 0
Plastering.—H. Pearson	291 17 0
Painting.—J. Butler	136 0 0
Tiling.—J. Season	405 2 0
Ironfounding.—Whitehead Bros.	212 4 0
Concreting.—A. & S. Wheeler	300 0 0

[All of Leeds.]

CHINGFORD.—For the erection of six houses, Beresford-road, on the Chingford Rise Estate. Mr. W. I. Chambers, architect, Savoy House, London:—

S. Horwood, Brixton Hill	£3,991
I. Weibking & Son, Southgate-road, N.	3,800
E. Turner, Hounslow	3,475
C. Watts, Putney	3,188
Dockeril & Son, Brompton	3,102
J. P. Groome, New North-road	2,880

[Architect's estimate, £3,125.]

CHINGFORD.—For the erection of six houses, Buxton-road, on the Chingford Rise Estate. Mr. W. I. Chambers, architect, Savoy House, London:—

S. Horwood	£3,453	Huntingford & Goddard	£2,920
Weibking & Son	3,300	Dockeril & Son	2,916
C. Turner	2,930	J. P. Groome	2,88-

[Architect's estimate, £2,920.]

EXMOUTH.—For the erection of a Baptist church, Victoria-road. Mr. P. Kerley, architect, Exmouth:—

Dart	£1,700 0	Stokes	£1,030 0
Abell	1,264 0	Lacey	995 0
Grace	1,031 0	Hayman, Exmouth*	868 17

FOLKESTONE.—For alterations to the Mechanics Arms, for Messrs. Thos. Phillips & Co., Limited, West Malling, Kent. Mr. A. H. Steele, architect, Folkestone-road, Dover. Quantities by the architect:—

Morrison	£955 10 0	Nicholls, Folkestone*	£848 16 4
Castle & Son	930 0 0		
Francis	854 0 0		

HARROW.—For the supply of 1,300 tons broken granite, &c., for the Urban District Council. Mr. J. P. Bennetts, Surveyor, Council Offices, Harrow:—

Rowley Regis Granite Co., Rowley Regis, Staffs*:—
2-in. Granite ..... 13s. od. per ton.
1½-in. ,, ... 13s. 6d. ,, ,,
Chippings ..... 9s. 10d. ,, ,,

HODDESDON (Herts).—For the construction of 270 yards of 12-in. pipe sewer, with manholes, &c., for the Urban District Council. Mr. T. Salkield, Surveyor, Lord-street, Hoddesdon:—

T. Adams	£449	M.S. Kitteringham, Waltham Cross*	£295
G. Bell	318		

KIRBY (Essex).—For the erection of schools to accommodate 250 children, for the School Board of Kirby, near Colchester. Mr. C. E. Butcher, architect, Queen-street, Colchester:—

A. Coe, Ipswich	£2,751
C. Oxley, Walton-on-the-Naze	2,691
H. W. Gladwell, Walton-on-the-Naze	2,664
F. J. Ward, Colchester	2,600
A. Diss, Colchester	2,495
H. J. Linzell, Newmarket	2,315
Dupont & Co., Colchester	2,279
Saunders & Sons, Dedham, Colchester	2,275
E. West, Chelmsford	2,225
J. McKay, Clacton-on-Sea	2,132

LEICESTER.—For the construction of sewers, &c., for the Corporation. Mr. E. G. Mawbey, C.E., Town Hall, Leicester:—

Barnes & Co.	£14,540 0 0	T. Philbrick	£10,199 16 9
E. Tempest	11,180 14 4	Johnson & Langley, Leicester*	9,992 5 12
Bentley & Loch	10,625 3 0		

[*See also next page.*

LONDON.—For the erection of five shops, High-street, Lewisham, S.E., for Messrs. Belcham. Mr. Alfred Roberts, architect, 18, Nelson-street, Greenwich :—

W. Mills	£5,425	H. L. Holloway	£5,090
H. Groves	5,398	T. D. Leng	4,880
W. Martin	5,381	Kennard Bros.	4,153
Jerrard & Son	5,233	J. Watt*	4,130

LONDON.—For the erection of nineteen houses, Boreham-road, Wood Green, for Mr. R. T. Baker. Mr. W. I. Chambers, architect, Savoy House, London :—

C. Watts, Putney* £6,365

LONDON.—For the erection of a studio and re-decorating the house, 13, Bloxfield-road, Maida Vale. Mr. W. I. Chambers, architect, Savoy House, London :—

Dockeril & Son, Brompton* £1,062 10

LONDONDERRY.—For laying a main sewer, Lovers' Glen and Duncreggan Valley, for the County Borough Council. Mr. W. J. Robinson, City Surveyor. Quantities by the Surveyor :—

McKee & Son £1,129
R. Colhoun, Strand, Londonderry* 895

MINEHEAD (Somerset).—For improvements to the sea-front for the Urban District Council. Mr. F. W. Roberts, engineer, Taunton. Quantities by the engineer :—

S. Saunders	£7,299 0 0	Morse Bros.	£4,603 0 0
R. H. B. Neal	5,843 0 0	J. Burgess	4,555 0 0
Grounds & Newton	5,820 6 0	E. Powell	3,993 9 9
J. Dickson	4,980 18 9	E. H. Page, Cardiff*	3,924 5 4

NORTHFLEET (Kent).—For the erection of six cottages, Springfield Estate, for the Kent and Essex House Investment Company, Limited. Mr. G. W. Cobham, Surveyor, 1, Edwin-street, Gravesend.

J. M. Dering	£1,672 0	J. Wilford	£1,290 0
Beal & Hubbard	1,396 0	S. Horwood	1,260 0
W. H. Black	1,300 10	W. E. Thomas	1,174 0
W. Andrews	1,290 0	A. E. Tong, Gravesend*	1,162 0

PENARTH.—For the supply of 900 tons basalt, for the Urban District Council. Mr. E. J. Evans, C.E., District Council Offices, Penarth :—

A. & F. Manuelle	£513 15	St. Keverne Stone Co.	£401 5
Wainwright & Co.	506 5	Runnalls, Penrance*	382 10
London Basalt Stone Co.	493 0		

SOUTHAMPTON.—For shop front and fittings, High-street, Shirley, Southampton, for the International Tea Company's Stores, Limited, Mitre-square, London. Mr. A. W. Galbraith, architect, Above Bar, Southampton :—

Jenkins & Son	£493	Playfair & Toole	£420
Oak & Sons	450	Wright & Son	401
Doggrell & Son	420	Bagshaw & Son*	397

TUNBRIDGE WELLS.—For the erection of technical institute and school of art, for the Corporation. Mr. H. T. Hare, architect, 13, Hart-street, Bloomsbury-square, W.C. Quantities by Messrs. Fleetwood, Son, & Eversden, and Mr. Norton :—

Martin & Co.	£13,475 0 0	J. Jarvis	£11,795 0 0
Cook & Sons	12,358 5 1	Crates & Son	11,600 0 0
Willcock & Co.	12,458 0 0	Davis & Leaney, Goudhurst*	11,434 0 0
Strange & Sons	11,837 0 0		

TWICKENHAM.—For the execution of street improvement works, Colne-road, &c., for the Urban District Council. Mr. F. W. Pearce, Surveyor, Town Hall, Twickenham :—

	May-road.	Seymour-gardens.	Alexandra-road.	Morley-road.
	£	£	£	£
Wimpey & Co.	743 ..	718 0 ..	630 ..	348
S. Kavanagh	725 ..	678 0 ..	587 ..	328
R. Ballard	675 ..	677 0 ..	537 ..	318
Lawrence & Thacker	640 ..	664 0 ..	550 ..	295
R. W. Swaker	— ..	555 15* ..	525 ..	300
Mowlem & Co.	654* ..	598 0 ..	424* ..	234*

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